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REPORT TITLE:

POROUS TIPPING PROCESS AND UNIFORMITY EVALUATION

CONFIDENTIAL

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KEYWORDS:
Porous Tipping, Ecusta, Hermetite, Dilution Uniformity, Non-Obvious Dilution, Gravure Print Roll, Taste Evaluations

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TABLE OF CONTENTS

		Page
I.	SUMMARY	1
II.	INTRODUCTION	2
III.	DISCUSSION	3
	A. EQUIPMENT AND PROCESS	3
	B. OPERATING INSTRUCTIONS	5
	C. DILUTION CONTROL AND UNIFORMITY	5
	D. TASTE EVALUATIONS	6
IV.	RECOMMENDATIONS	7
V.	REFERENCES	8
VI.	TABLES	
	I. Dilution vs. Skip Pattern Area - Cork Porous	9
	II. Dilution vs. Skip Pattern Area - White Porous	10
	III. Dilution Uniformity (Porous vs. Perforated vs. Hauni)	11
VII.	FIGURES	
	I-XV Dilution Uniformity	12-26
VIII.	APPENDIX	
	I. Porous Tipping Cost Estimate	27
	II. Ecusta Technical Report	31
	III. Printer Roll Process Drawings	34
	IV. Taste Evaluation Results	45
	V. Tipping Samples	53

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I. SUMMARY

Both Ecusta and Hermetite porous tippings have been evaluated as alternate methods of achieving filter dilution. The dilution resulting from porous tipping is non-obvious and is primarily controlled by the porosity of the inner combining wrap. Dilution averages of 10 - 40% have been achieved using Ecusta Reference 592 and 626 porous plug wraps. The uniformity of porous tipping dilution is similar to perforated and Hauni pin systems.

Initial samples of the Ecusta porous tipping required modification to the adhesive application system and the PVA formulation. Subsequent samples were processed with the standard adhesive and application system.

National Product Opinion Laboratory (POL) testing found the Ecusta porous tipping to be equivalent in taste characteristics to perforated and Hauni pin systems. No preferences for the non-obvious dilution characteristics of porous tipping were noted.

Porous tipping (Ecusta) is more expensive than perforated tipping (Appendix I), but might offer some distinct advantages over perforated and Hauni pin systems (Recommendations). No price comparisons to the Hauni pin system were conducted.

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II. INTRODUCTION

Porous tipping paper offers a non-obvious alternative to perforated or Hauni pin ventilated systems. With porous tipping, the dilution air enters the filter through a large number of small openings which are not visible to the naked eye. Consequently a cigarette made with porous tipping looks very similar to a regular non-diluted cigarette.

Porous cork tipping can be matched in color to the regular cork tipping but because of its porosity, it is slightly more mottled in appearance. White porous tipping is generally not as opaque as regular white tipping.

Both Ecusta and Hermetite have supplied sample tippings. Ecusta porous tippings utilize a Reference 626 combining wrap base sheet over which is printed either a cork or a white opacifying pattern. Both the white and cork patterns are commercially available and can be printed with special designs - such as gold rings, names, etc. Initial Ecusta samples would not process on the standard Hauni Max assembler, so an alternate adhesive and application system was developed. Later samples, however, processed satisfactorily on the standard system.

Hermetite samples are made from a new, long fiber, white base sheet supplied by Schweitzer; and, like Ecusta, they overprint the desired color or pattern. Unlike Ecusta, their samples have always processed on the Hauni Max assembler with the standard adhesive system. Minor flagging problems have been noted with some samples.

Samples of both tippings are shown in Appendix V.

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III. DISCUSSION

A. EQUIPMENT AND PROCESS

1. Gravure Printer Roll Set-Up

Initial samples of the Ecusta porous tipping were highly absorbent and required modification of the PVA adhesive and development of a special glue application system. Modifications to the glue application system on the production Hauni Max III assembler and the PVA adhesive formulation were as follows:

a. The standard smooth transfer roll was replaced with a gravure type printer roll[1] (Appendix III-Figures I-IV).

b. The standard metal dip roll was replaced with a rubber coated roll without raised edges (Appendix III-Figure V).

c. The tipping position lever above the transfer roll was replaced with a rubber backup roll (Appendix III-Figure VI).

It should be noted that the addition of the rubber back-up roll eliminated the automatic lift-off of the tipping from the transfer (printer) roll during machine shutdown. If this process were necessary, modifications would have to be made to provide for this in a production situation.

d. A thickening agent (0.5% Methocel 90 HG, Dow Chemical) was added to the standard PVA.

The gravure roll, along with a higher viscosity PVA (18,000[2] vs. 1,800 cps), allowed reduced amounts of adhesive to be printed on the surface of the tipping. The higher viscosity

[1]Modified Hauni glue roll, plated and etched by Inta-Rota, Inc., Richmond, Virginia. (Mechanical engraving can also be done by Inta-Rota)

[2]Brookfield Viscometer Model RVT-Spindle #7 @ 20 RPM.

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adhesive reduced penetration, allowing a normal tipping operation from the transfer roll (printer roll station) on. A rubber coated dip roll was used in order to insure complete contact of the dip roll with the printer roll. A schematic of the modified adhesive system is shown in Appendix III-Figure VII.

Because the gear attached to the transfer roll (printer roll) interfered with the copper plating (step necessary for chrome plating) operation, the transfer roll was ground down and fitted with a copper sleeve (Appendix III-Figures VIII-XI). The roll was then ground to the original diameter. With this copper sleeve already in place, chrome plating and etching were done without difficulty. It was discovered later, however, that softened Hauni rolls could be mechanically engraved - making the copper plating unnecessary.

2. Standard Tipping Process

Subsequent testing on later, more fully developed samples of the Ecusta porous tipping paper revealed that the gravure printer roll process was unnecessary. The standard tipping process appears entirely satisfactory for current commercially produced samples of Ecusta's porous tipping.[1]

> NOTE: At least a 2 mm lap seam is necessary for porous tipping to seal properly. Caution should be observed in making filter rods with porous combining wrap to insure proper circumference.
>
> Also, the vacuum system on the Hauni Max should be checked to insure maximum efficiency of operation.

Two demonstration runs of 32,000 cigarettes each showed no significant build-up (due to penetration of adhesive) on the vacuum drum during making. Also, packaged cigarettes showed no evidence of sticking together after either shelf or accelerated aging.

[1]Ecusta White porous tipping was also run on the Mark IX and PA 8 assembler in the New Manufacturing Center with successful results.

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B. OPERATING INSTRUCTIONS

Operating procedures for the Hauni Max assembler when using porous tipping are the same as those used with standard non-porous tippings.

C. DILUTION CONTROL AND UNIFORMITY

Initially it was thought that cigarette dilution could be controlled by the width of the skip pattern as well as the porosity of the tipping and the porous plug wrap (Ecusta Research and Development Report, May 29, 1973 - Appendix II). However, investigation of several different widths of skip pattern (Tables I-II, Appendix III-Figures I-III) showed no significant change in cigarette dilution. Apparently, the level of adhesive being applied is not enough to significantly affect the porosity of the tipping. Consequently, a continuous or solid application (Appendix III-Figure IV) is used rather than a skip pattern. This procedure eliminates registration problems encountered with "Skip" tipping and gives a better lap seal. Solid adhesive application is used with both the printer roll set-up and the standard application system.

For a given tipping porosity, the level of dilution is primarily controlled by the porosity of the combining wrap. Table III shows dilution levels expected utilizing Ecusta Reference 592 or 626 combining wraps for both cork and white porous tipping. Typical dilution data for perforated and Hauni pin systems are included for comparison purposes. Frequency distribution curves are shown in Figures I-XV[1].

From the data in Table III, it appears that the dilution uniformity achieved with the standard process is better than that achieved with the printer roll set-up. This difference could be due in part to the more uniform application of adhesive achieved with the standard process.[2] The dilution uniformity achieved with perforated and Hauni pin ventilated

[1]Dilution readings on cigarettes with porous tipping are taken over the entire filter minus the 5 mm inserted into the dental dam/holder assembly.

[2]Problems were encountered in keeping the plated and etched rolls round.

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systems is similar to that achieved with porous tipping run with the standard process.

D. TASTE EVALUATIONS

Except for minor differences noted by the Descriptive Panel, local and National POL testing showed the Ecusta porous tipping to be equivalent in taste characteristics to perforated and Hauni pin systems (Appendix IV). No preferences were noted for the non-obvious dilution characteristics of the porous tipping.

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IV. RECOMMENDATIONS

Although porous tipping systems are slightly more expensive due to material costs, it is felt that porous tipping offers certain advantages that might lead to more efficient - hence less costly - manufacture of cigarettes.

For example, (1) "Skip" tipping is unnecessary with porous tipping systems. This would eliminate the tedious registration that "Skip" tipping normally requires; (2) Hauni pins are eliminated. No down time due to pin breakage or replacement would be incurred.

Another example that is not cost related, but might have marketing and consumer ramifications, is the non-obvious dilution characteristics of porous tipping. Although National POL testing showed no preference for porous tipping, having non-obvious dilution might be a distinct advantage over the large number of perforations or pin holes required for some "low" delivery cigarettes. The smoker would not be able to infer the level of dilution and/or delivery by observing the number of "holes" in the filter.

It is therefore recommended that porous tipping be given serious consideration as an alternate method of achieving filter dilution.

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REFERENCES

Notebook 5371: p. 1

Notebook 6029: p. 29
p. 36
pp. 42-43
p. 46
pp. 73-76
p. 79

Notebook 6167: p. 15
p. 28
p. 61
p. 63
p. 66

Notebook 6325: pp. 29-31

Notebook 6463: p. 91

Notebook 6568: p. 99

Notebook 6658: pp. 41-44

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TABLE I

DILUTION VERSUS SKIP PATTERN AREA

ECUSTA POROUS CORK TIPPING

Code	Skip Pattern Width[1] mm	Dilution % of 1050 cc
D3PY	5 (110 mm^2)	19
D3PZ	8 (176 mm^2)	20
D3QA	11 (242 mm^2)	19

[1]Area of tipping not covered with Adhesive

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TABLE II

DILUTION VS. SKIP PATTERN AREA

ECUSTA POROUS WHITE TIPPING

Code	Skip Pattern Width[1] mm	Dilution % of 1050 cc
D3QB	5 (110 mm^2)	12
D3QC	8 (176 mm^2)	14
D3QD	11 (242 mm^2)	12

[1]Area of tipping not covered with Adhesive

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TABLE III

DILUTION UNIFORMITY

POROUS TIPPING VERSUS PERFORATED TIPPING VERSUS HAUNI PINS

CODE	TIPPING TYPE	PLUG WRAP	DILUTION $\bar{X}$	DILUTION S	DILUTION Cv
POROUS[1]					
D3AGZ	Ecusta Cork	Ecusta 592	19	4.4	23 %
D3AGY	Ecusta White	Ecusta 592	13	2.8	21
D3AGV	Ecusta Cork	Ecusta 626	29	4.9	17
D3AGU	Ecusta White	Ecusta 626	27	3.9	15
POROUS[2]					
D3AGX	Hermetite Cork	Ecusta 592	13	2.6	20
D3AGW	Hermetite White	Ecusta 592	15	2.1	14
D3AGT	Hermetite Cork	Ecusta 626	19	3.1	17
D3AGS	Hermetite White	Ecusta 626	30	4.2	14
D5BT	Ecusta Cork	Ecusta 592	19	2.4	12
D5BU	Ecusta White	Ecusta 592	11	1.3	11
D5BV	Ecusta Cork	Ecusta 626	38	3.4	9
D5BW	Ecusta White	Ecusta 626	23	2.7	12
PERFORATED					
D5BZ	Ecusta Reg. Cork (2 Rows of Perf.)	Ecusta 626	21	2.3	11
D2AXL	Ecusta Reg. Cork (5 Rows of Perf.)	Ecusta 626	28	2.9	10
HAUNI PINS					
D5BX	Ecusta Reg. Cork (5 Hauni Pins)	--	17	2.3	13

[1]Gravure Printer Roll Process

[2]Standard Process

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FIGURE I

DILUTION UNIFORMITY

POROUS TIPPING

(ECUSTA CORK - ECUSTA 592 PLUG WRAP)

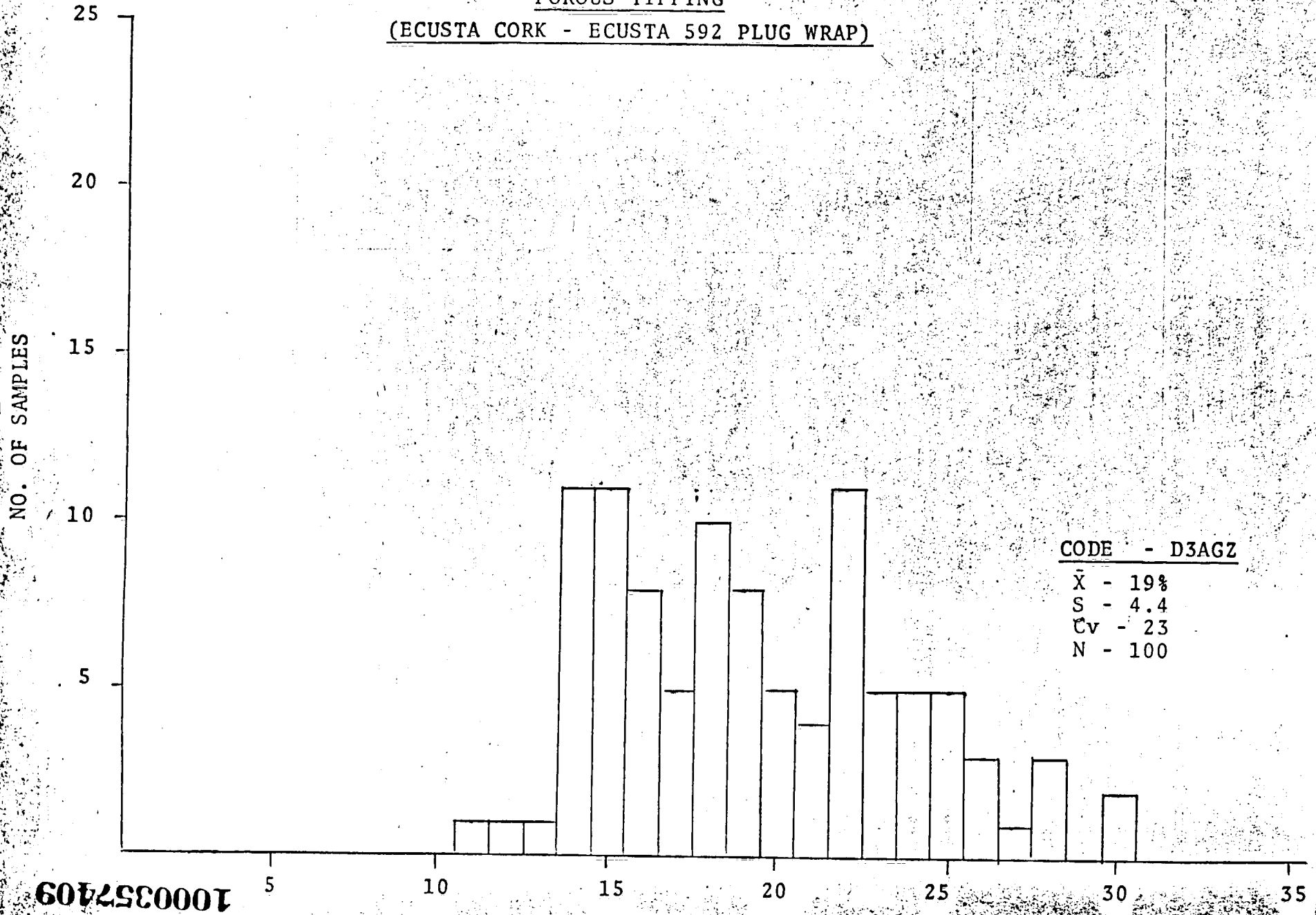

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FIGURE II

DILUTION UNIFORMITY

POROUS TIPPING

(ECUSTA WHITE - ECUSTA 592 PLUG WRAP)

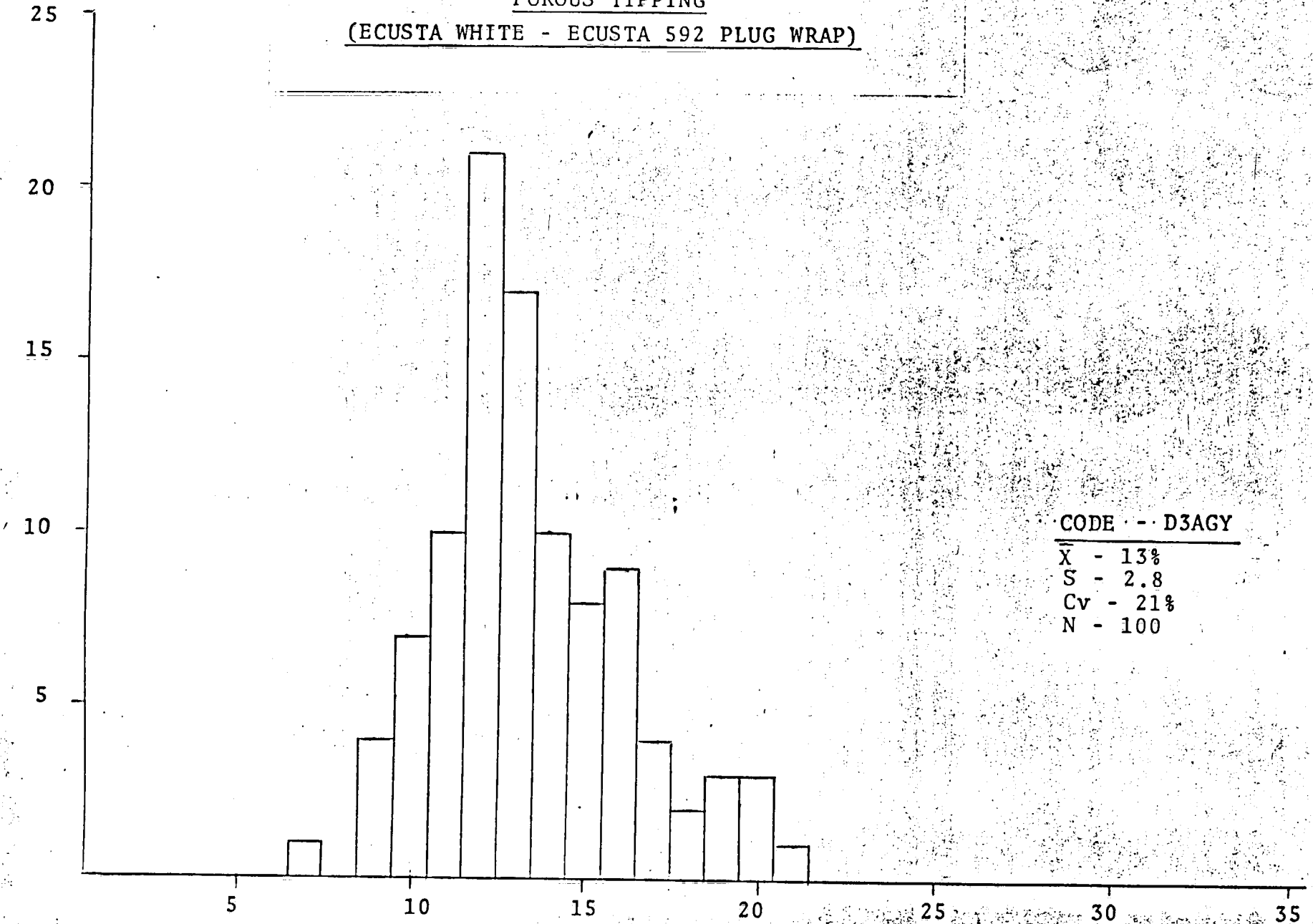

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FIGURE III

DILUTION UNIFORMITY

POROUS TIPPING

(ECUSTA CORK - ECUSTA 626 PLUG WRAP)

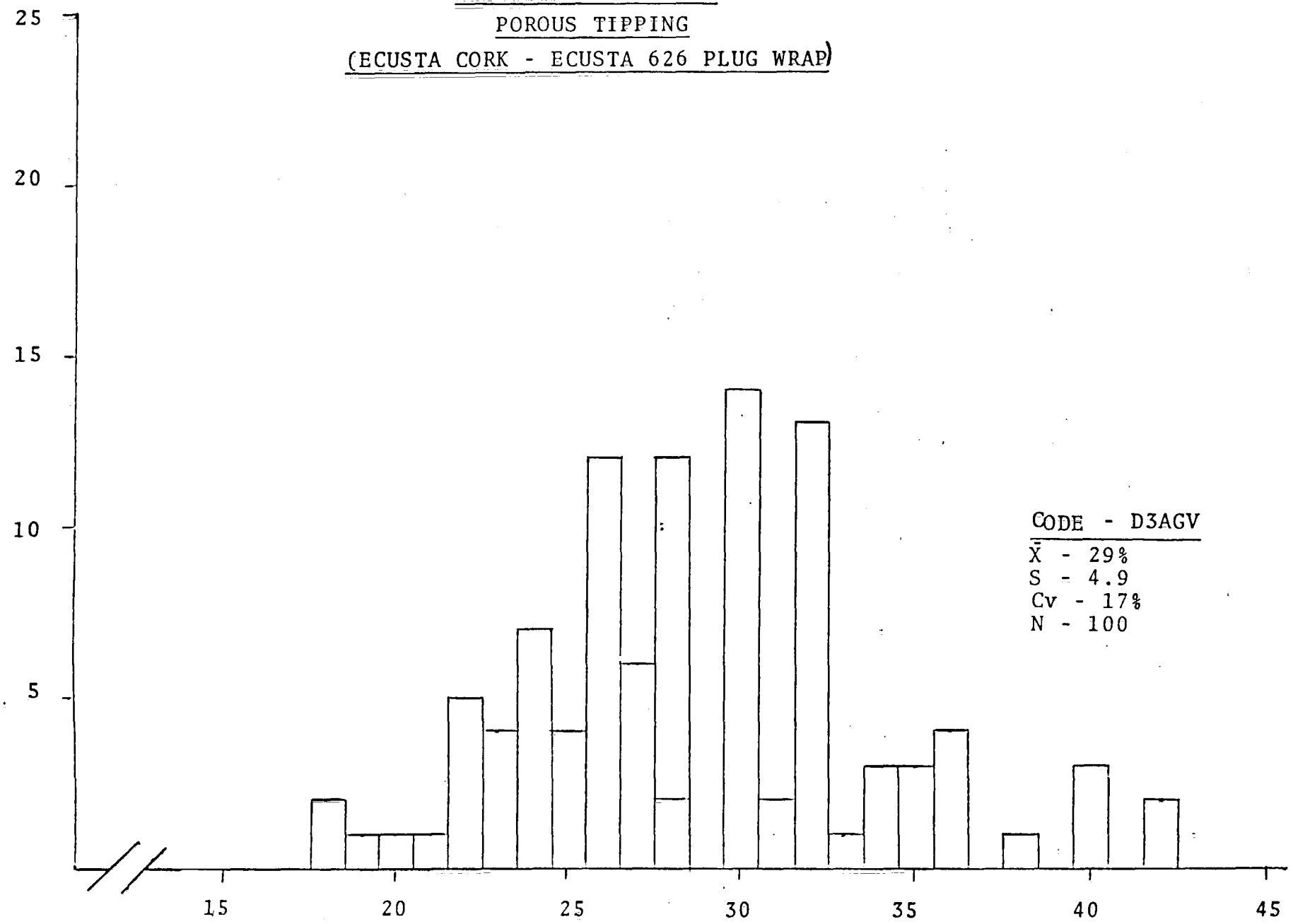

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FIGURE IV

DILUTION UNIFORMITY

POROUS TIPPING

(ECUSTA WHITE - ECUSTA 626 PLUG WRAP)

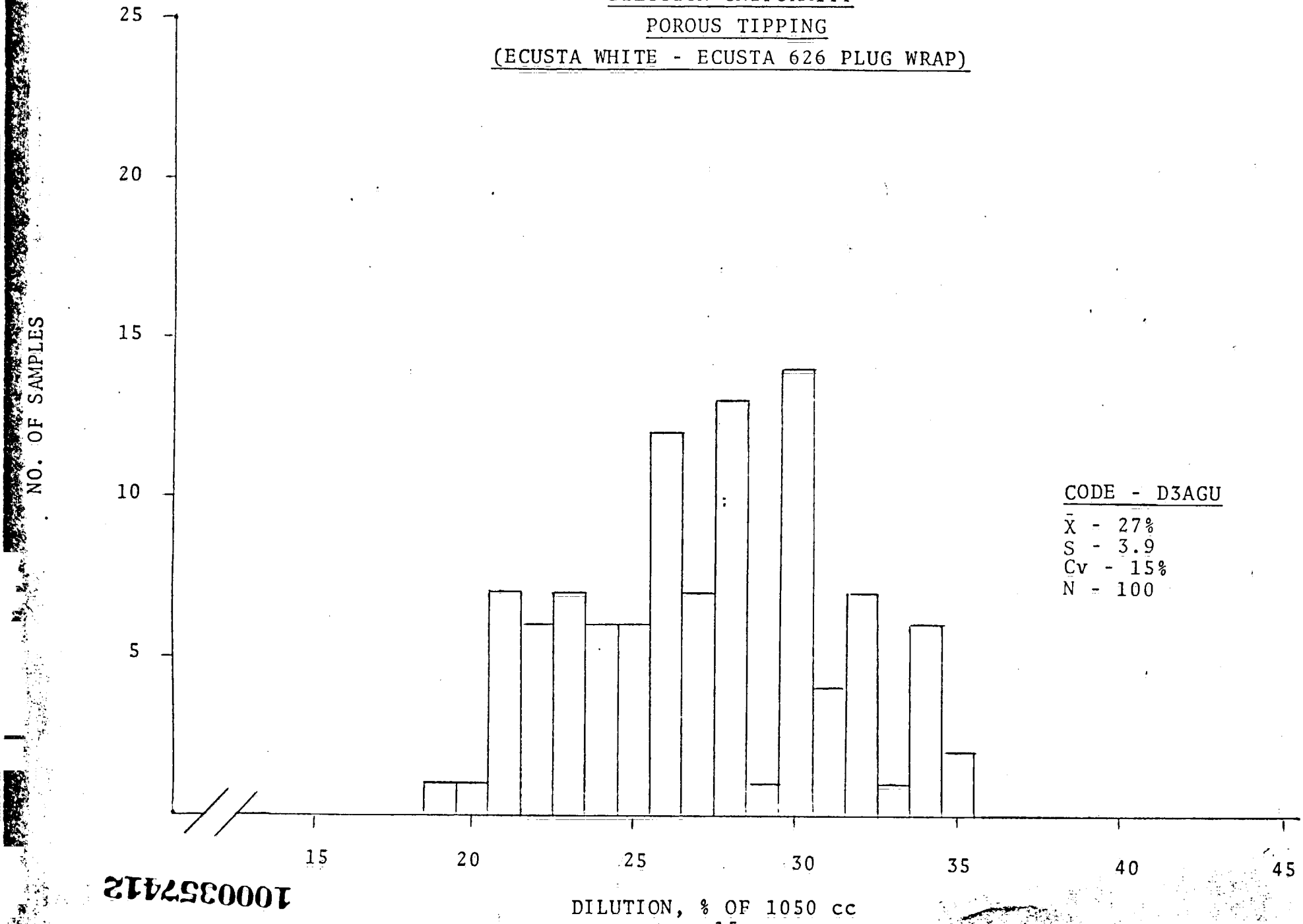

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FIGURE V

DILUTION UNIFORMITY

POROUS TIPPING

(HERMETITE CORK - ECUSTA 592 PLUG WRAP)

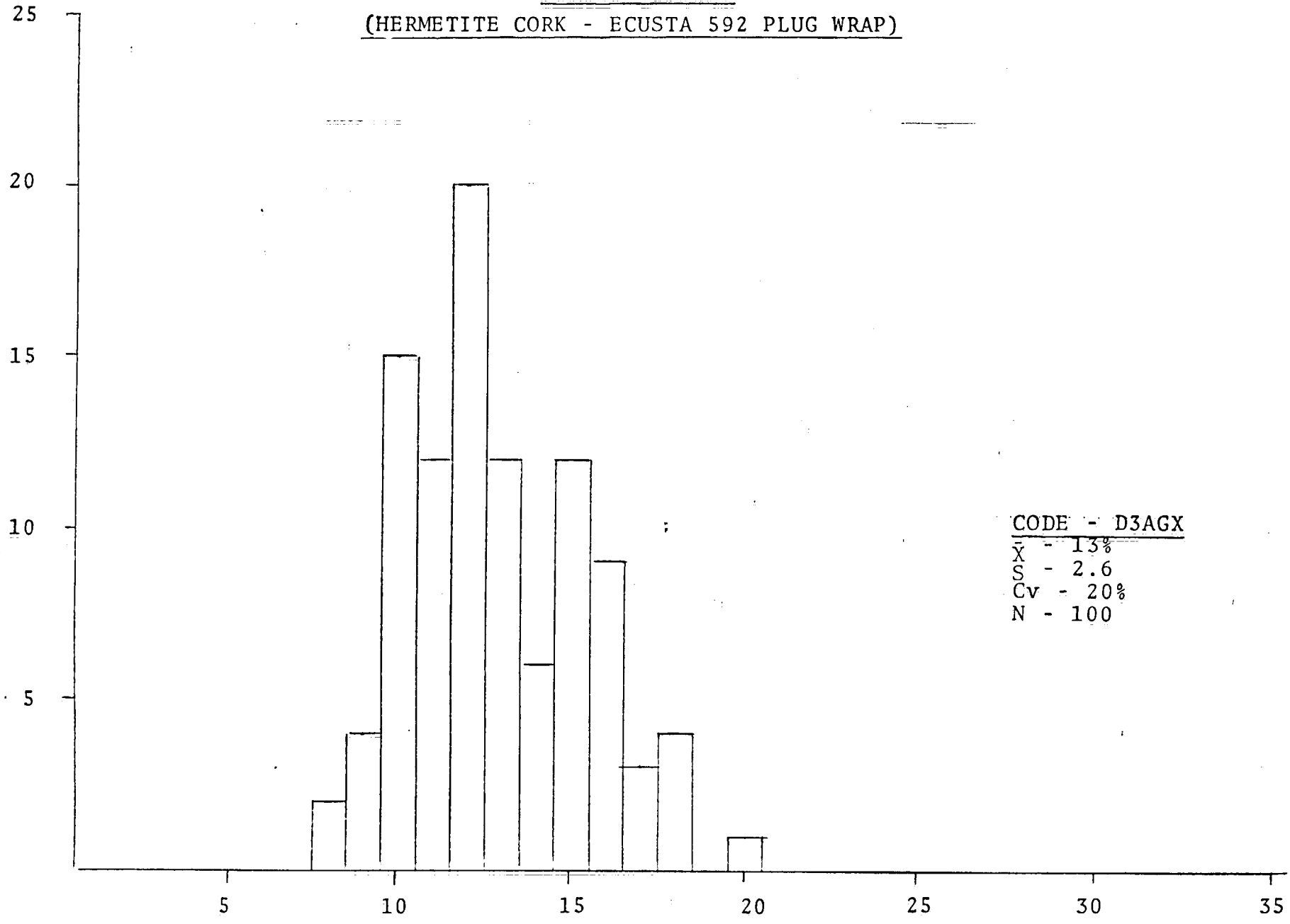

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FIGURE VI

DILUTION UNIFORMITY

POROUS TIPPING

(HERMETITE WHITE - ECUSTA 592 PLUG WRAP)

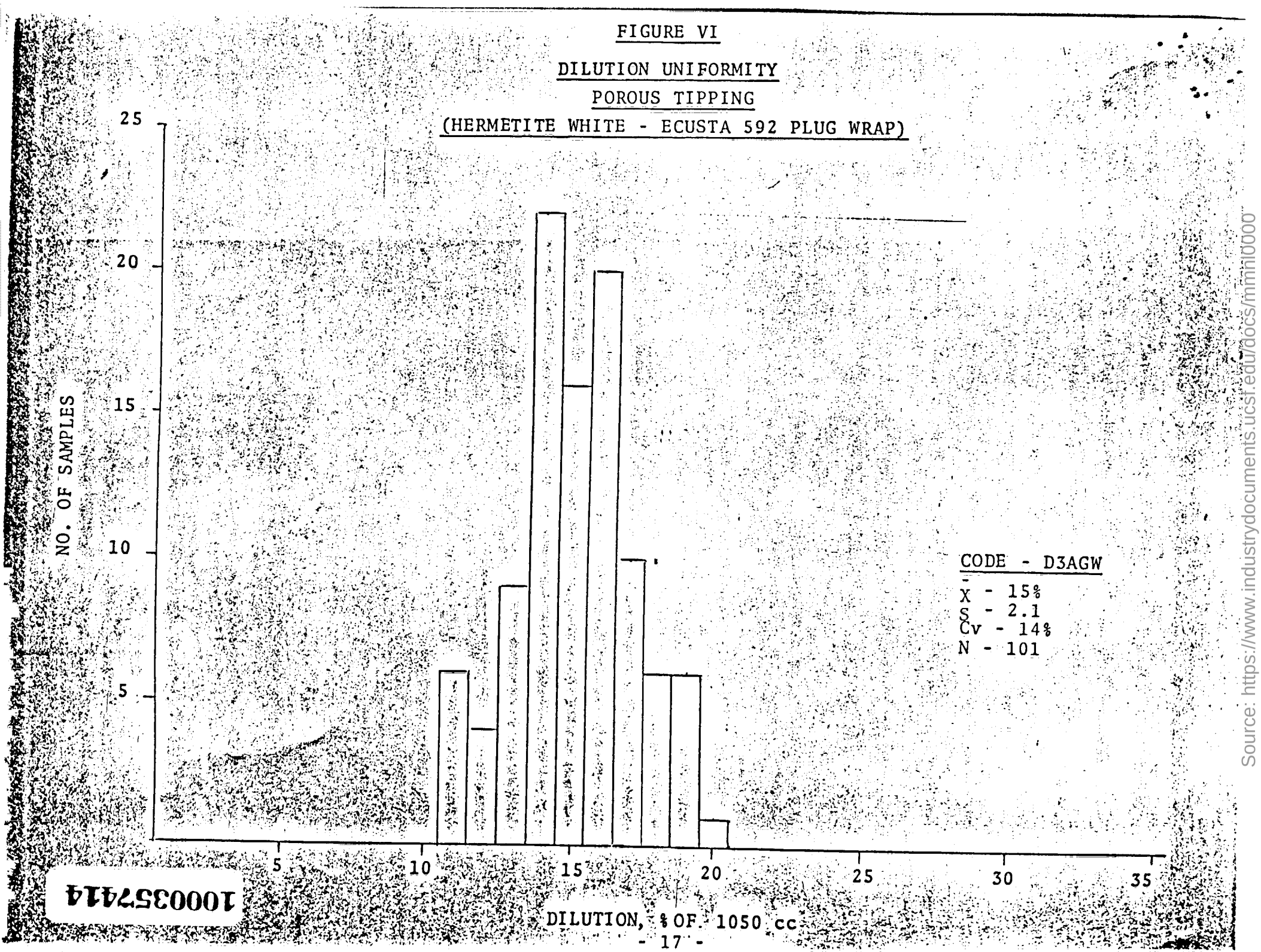

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FIGURE VII

DILUTION UNIFORMITY

POROUS TIPPING

(HERMETITE CORK - ECUSTA 626 PLUG WRAP)

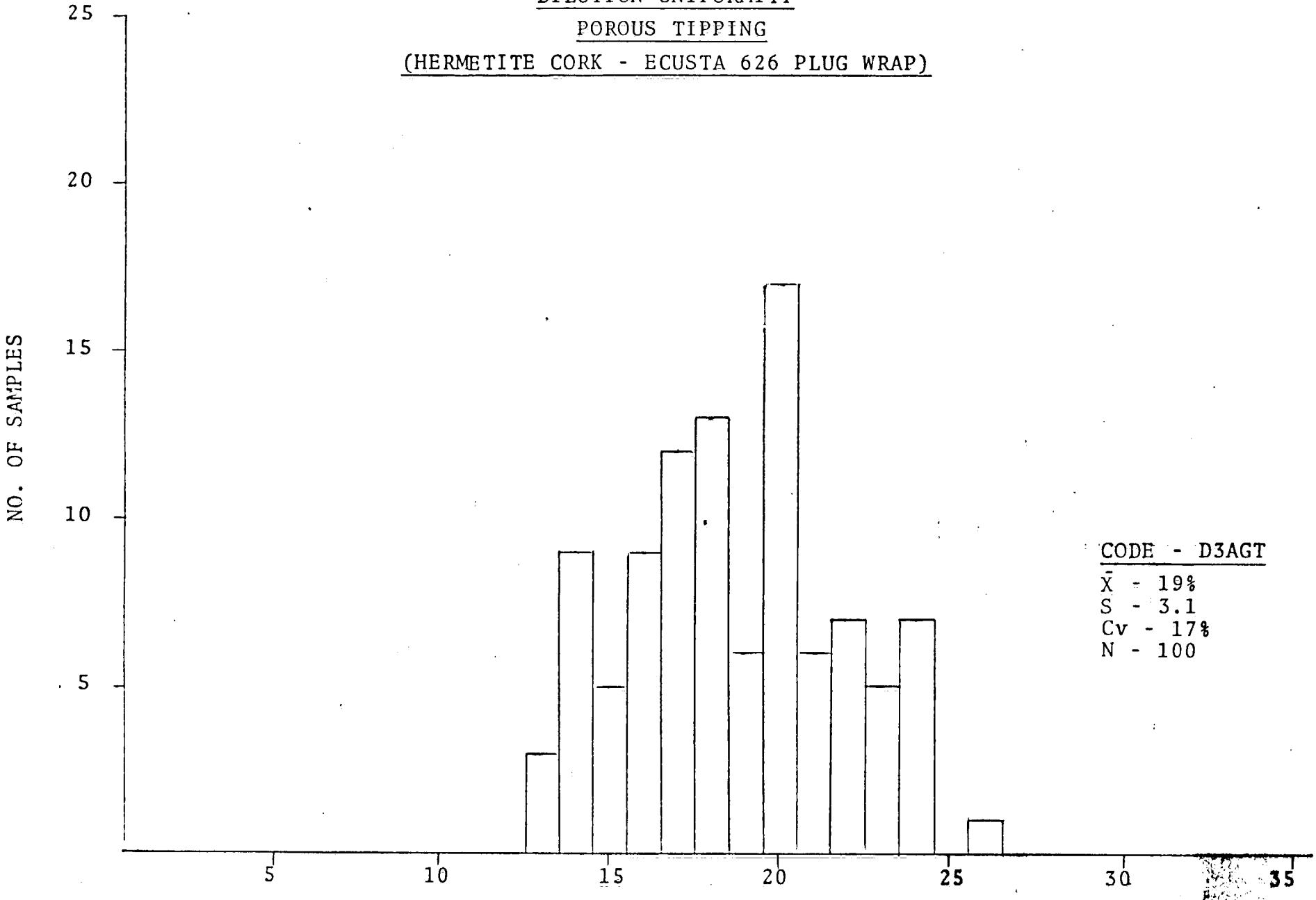

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FIGURE VIII

DILUTION UNIFORMITY

POROUS TIPPING

(HERMETITE WHITE - ECUSTA 626 PLUG WRAP)

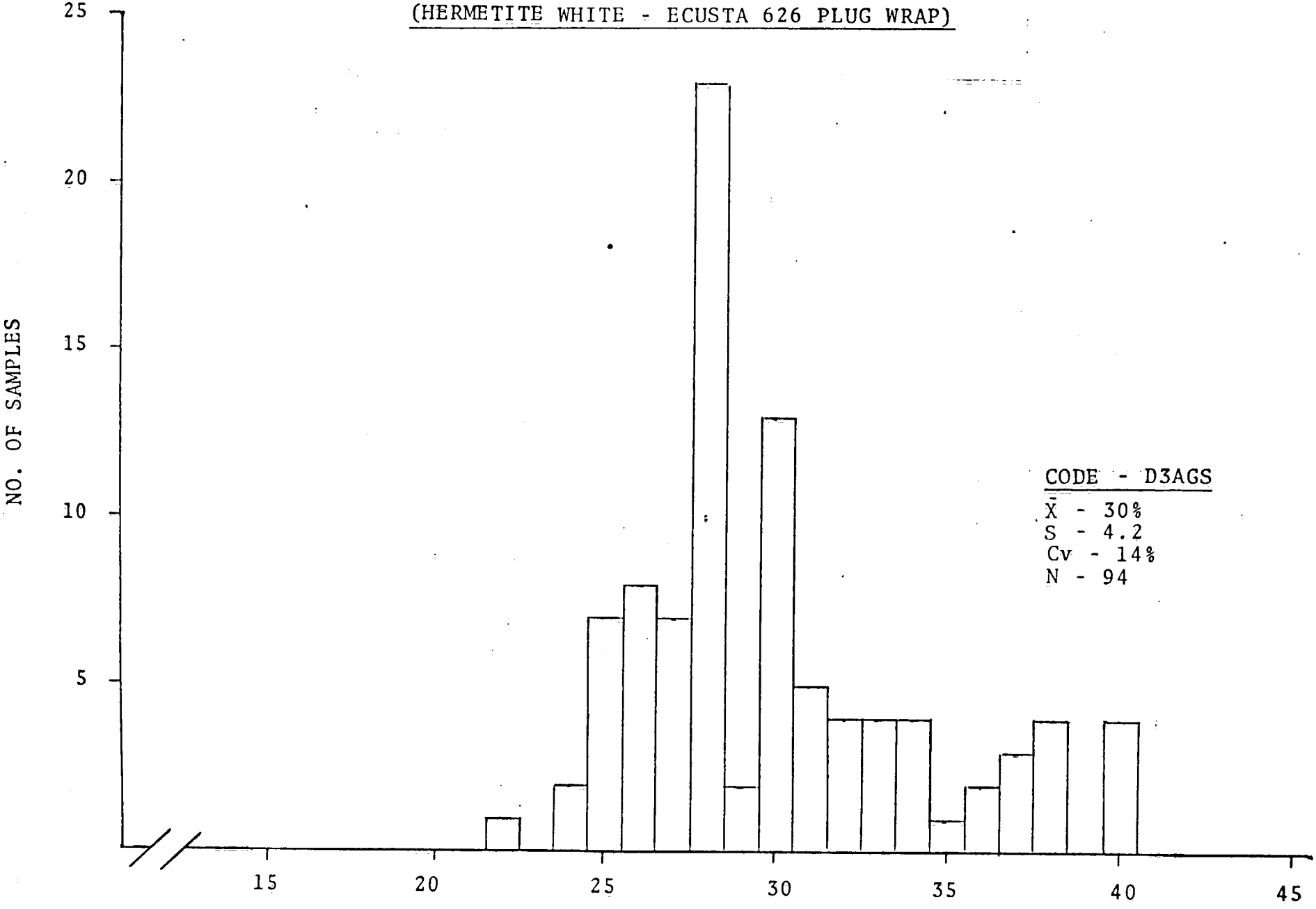

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FIGURE IX

DILUTION UNIFORMITY

POROUS TIPPING

(ECUSTA POROUS CORK - ECUSTA 592 PLUG WRAP)

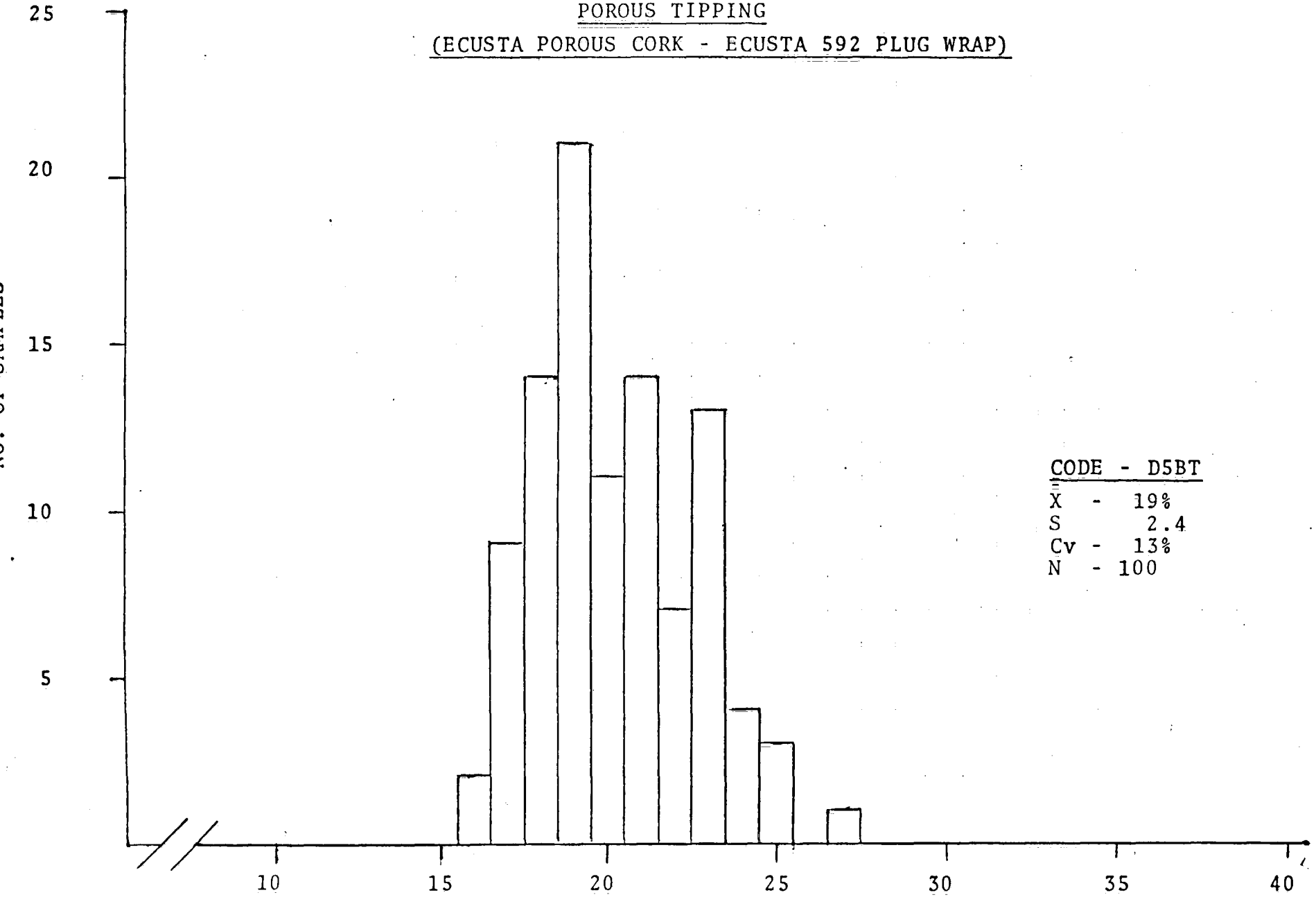

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FIGURE X

DILUTION UNIFORMITY

POROUS TIPPING

(ECUSTA POROUS WHITE - ECUSTA 592 PLUG WRAP)

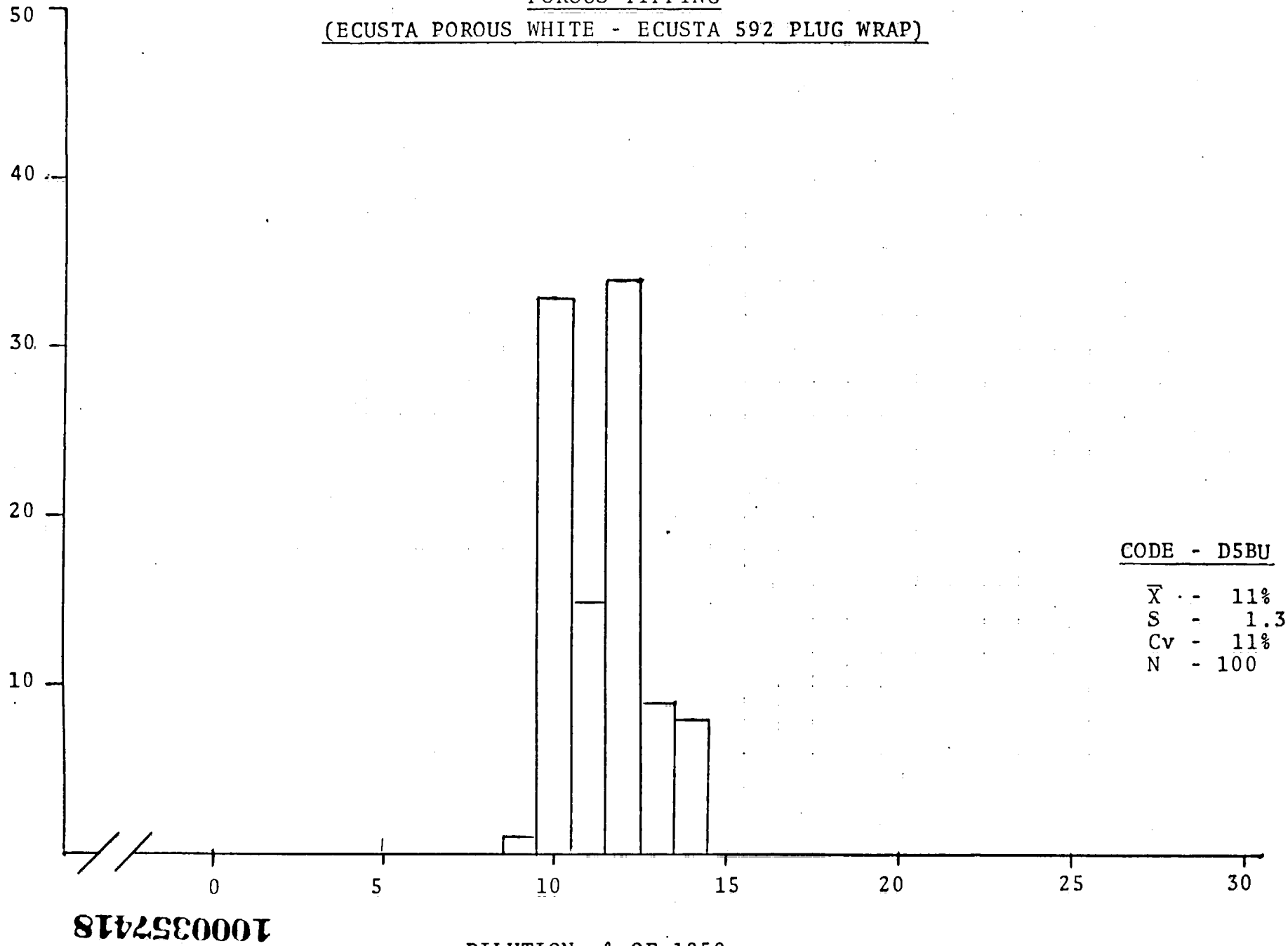

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FIGURE XI

DILUTION UNIFORMITY

POROUS TIPPING

(ECUSTA POROUS CORK - ECUSTA 626 PLUG WRAP)

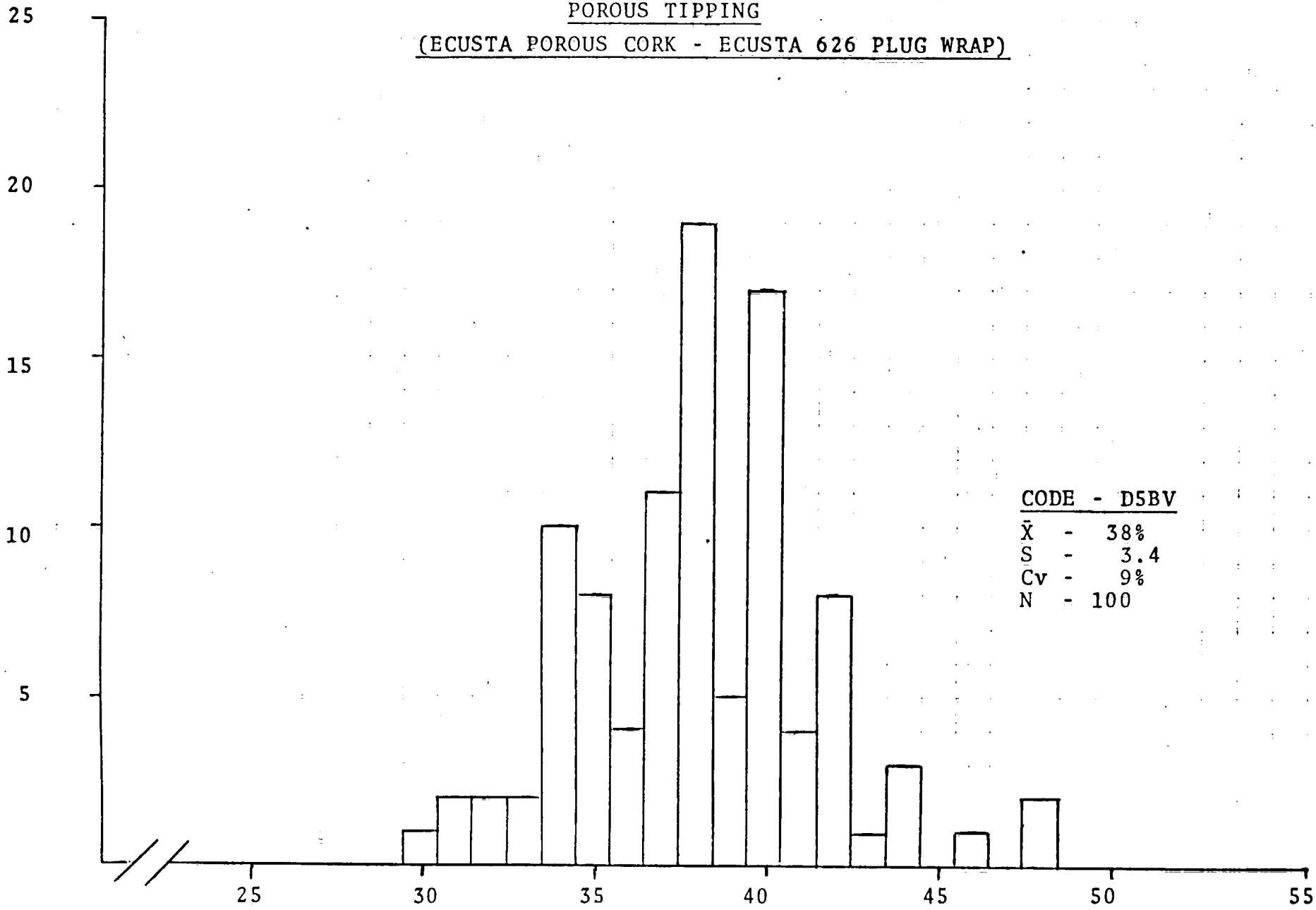

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FIGURE XII

DILUTION UNIFORMITY

POROUS TIPPING

(ECUSTA POROUS WHITE - ECUSTA 626 PLUG WRAP)

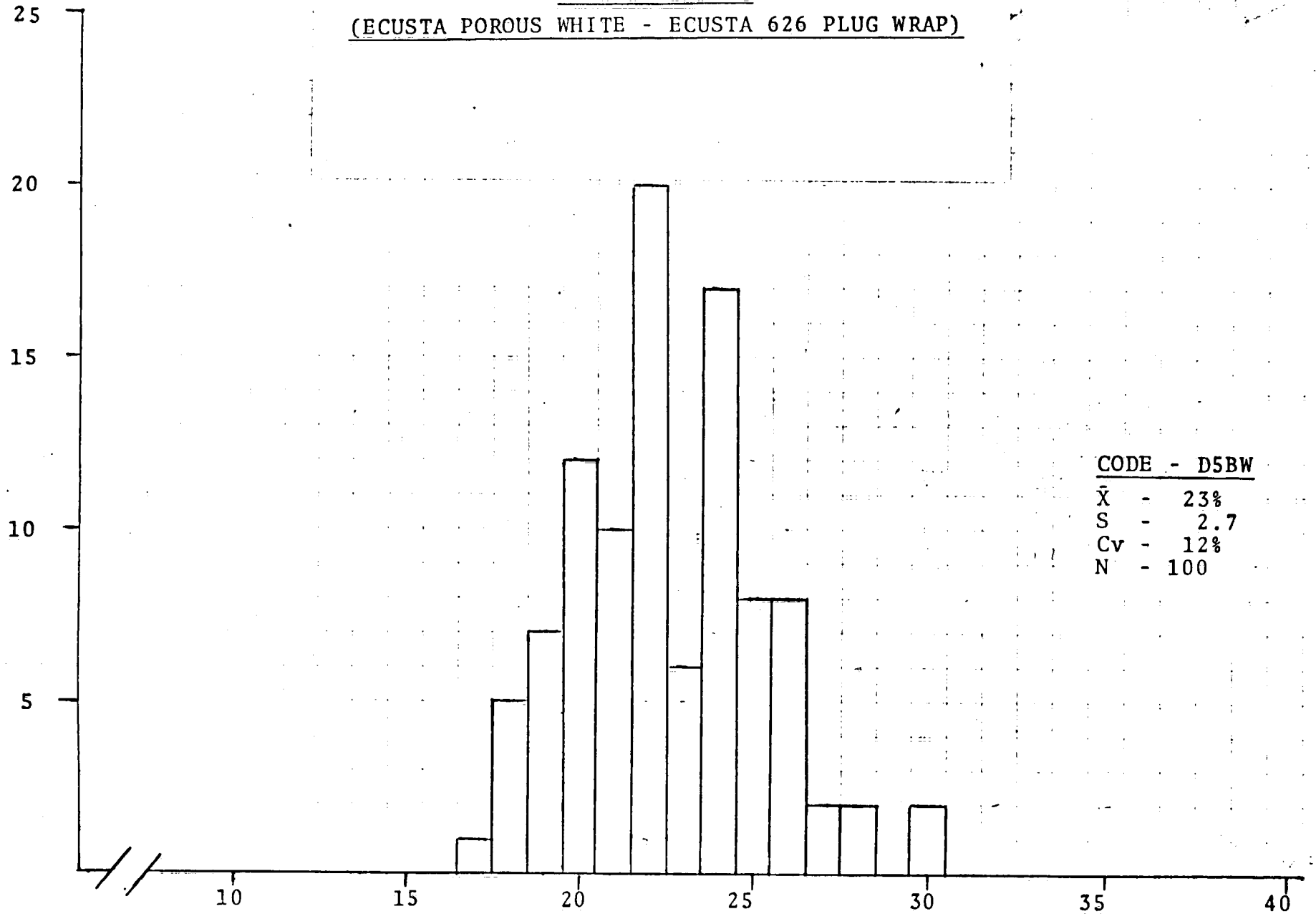

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FIGURE XIII

DILUTION UNIFORMITY
PERFORATED TIPPING
(ECUSTA CORK - 2 ROWS OF PERFORATIONS)

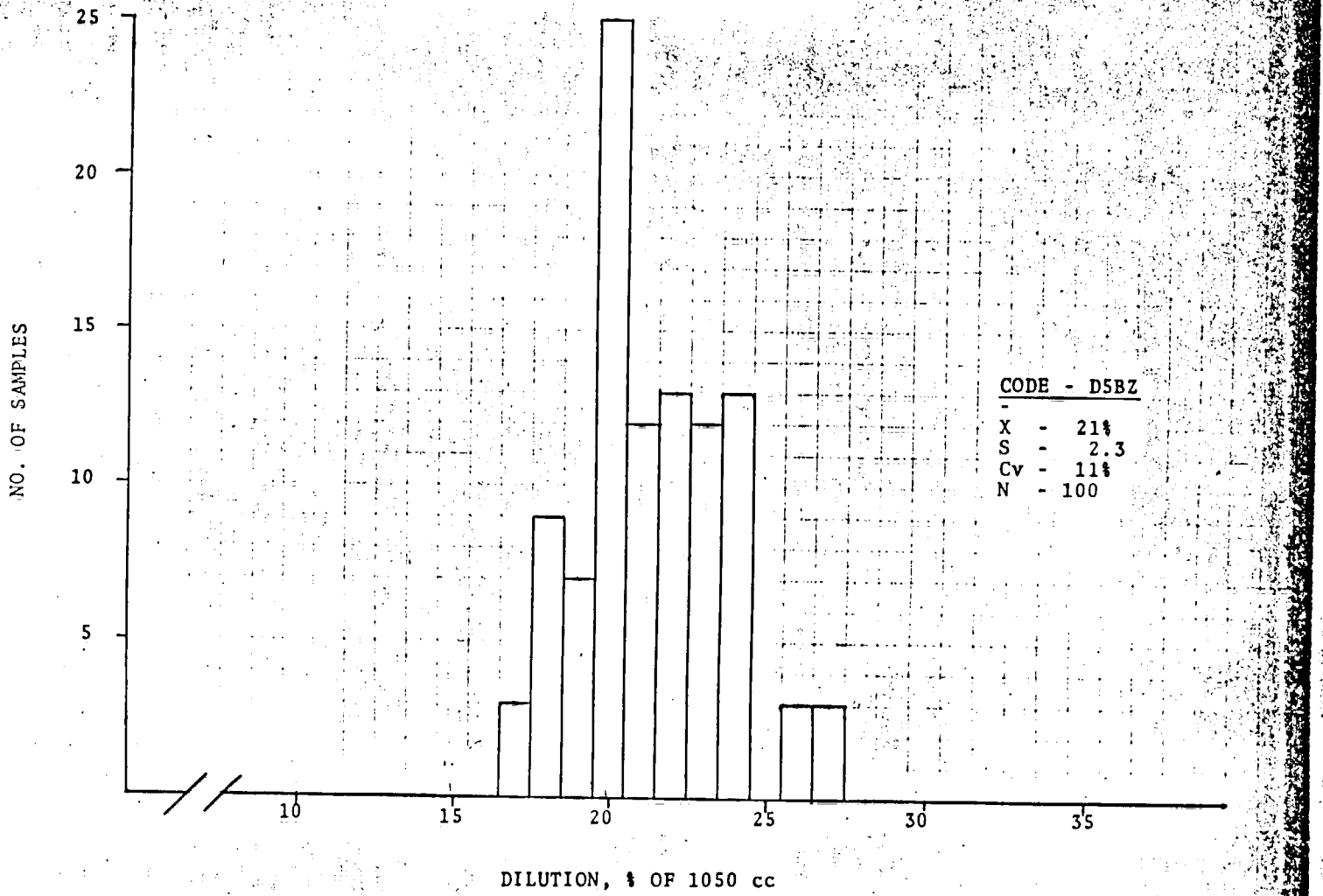

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FIGURE XIV

DILUTION UNIFORMITY

PERFORATED TIPPING

(ECUSTA CORK - 5 ROWS OF PERFORATIONS)

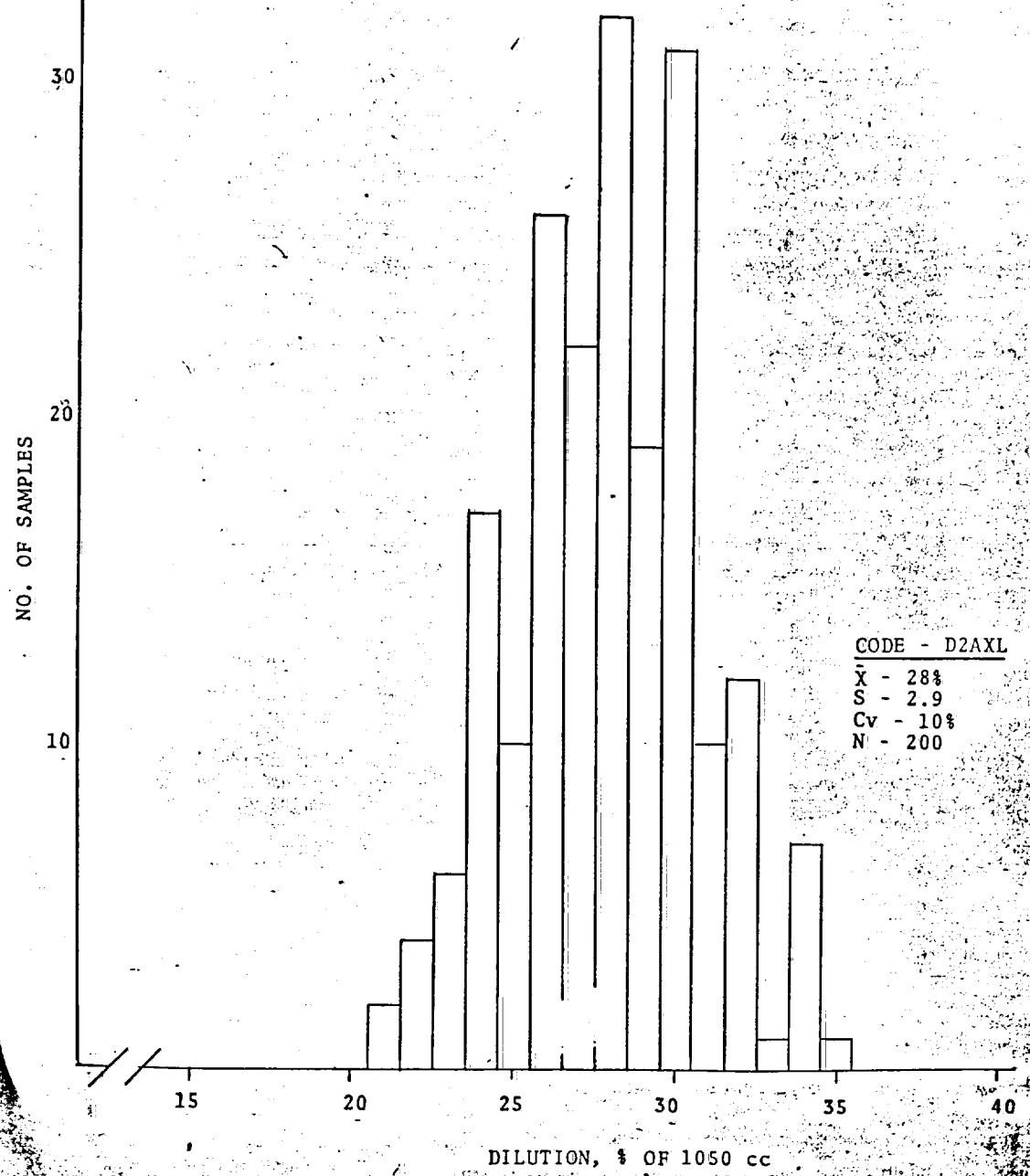

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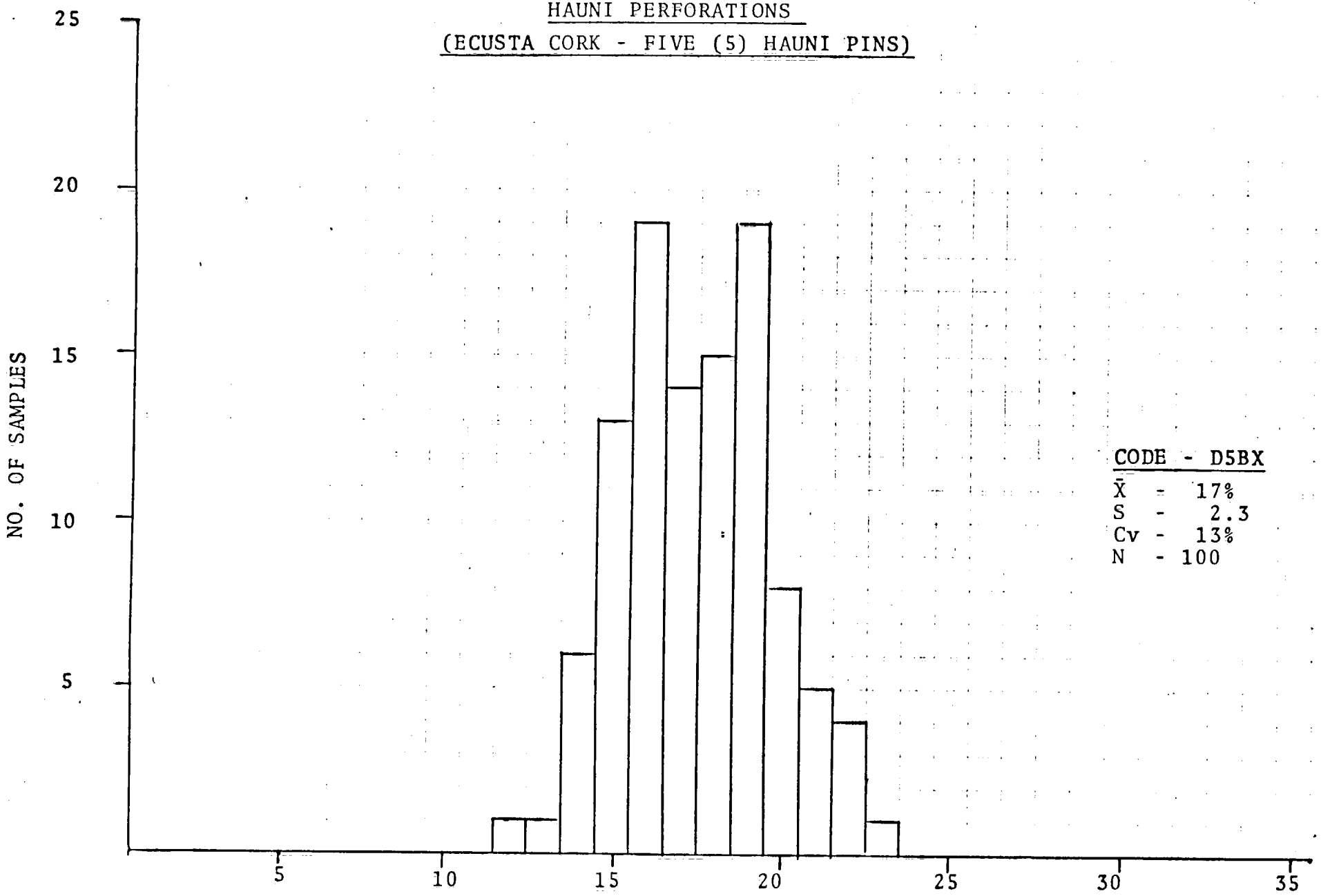
FIGURE XV

DILUTION UNIFORMITY

HAUNI PERFORATIONS

(ECUSTA CORK - FIVE (5) HAUNI PINS)



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APPENDIX I

POROUS TIPPING COST ESTIMATES

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PRICE COMPARISON

ECUSTA PERFORATED TIPPING VERSUS ECUSTA POROUS TIPPING

COST OF TIPPING ONLY

	COST/M CIGARETTES[1]
Ecusta Perforated Cork	0.1468
Ecusta Porous Cork	
Single Pass	0.2062
Double Pass[2]	0.2436
Ecusta Perforated White[3]	0.1792
Ecusta Porous White[4]	0.2879

[1] 60 mm Wide Tipping.

[2] If necessary to obtain color.

[3] Based on price of $17.925/2700 M bobbin.

[4] Includes a pattern to obscure rod filter junction.

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PHILIP MORRIS
U.S.A.
INTER-OFFICE CORRESPONDENCE

RICHMOND, VIRGINIA

To: Files

Date: December 10, 1974
(12/9/74)

From: L. F. Meyer

Subject: Ecusta Paper Company - Telephone Conversation

I talked with Mr. William Owens of Ecusta Paper Company today regarding price quotes on the ultra porous tipping paper they have recently developed. Bill gave the following tentative quotes, however, he said he has asked for a review of these prices because they sounded high to him.

1. For white porous tipping including a pattern to obscure the REDACTED and cigarette junction a price of REDACTED or approximately REDACTED per 2,000 meter bobbin.

2. For cork porous tipping - if a single pass to obtain color can be used - a price of $0.1273/m^2$ or approximately REDACTED per 2,000 meter bobbin.

   - if a double pass to obtain color is required, then the price is REDACTED or approximately REDACTED per 2,000 meter bobbin.

These prices are to be compared against normal cork tipping costs - REDACTED per 3500 meter bobbin and normal white tipping costs - REDACTED per 2700 meter bobbin.

L. Meyer

LFM/hws

cc: F. Resnik
R. Thomson
P. Gauvin

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PHILIP MORRIS
U.S.A.
INTER-OFFICE CORRESPONDENCE

RICHMOND, VIRGINIA

To: Files Date: February 18, 1975

From: W. G. Houck, Jr.

Subject: Ecusta Paper Company - Telephone Conversation

The following price quotes concerning combining wrap and tipping paper were conveyed to me by Mr. Bill Owens of Ecusta Paper Company on February 18, 1975.

I. Combining Wrap

a. Ecusta 492
b. Ecusta 592
c. Ecusta 626

REDACTED

II. Tipping Paper

a. Regular Cork
b. Perforated Cork (48-65 mm widths)

REDACTED

W. G. Houck, Jr.

WGH/hws

cc: L. F. Meyer
W. E. Claflin
P. N. Gauvin

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APPENDIX II

ECUSTA TECHNICAL REPORT

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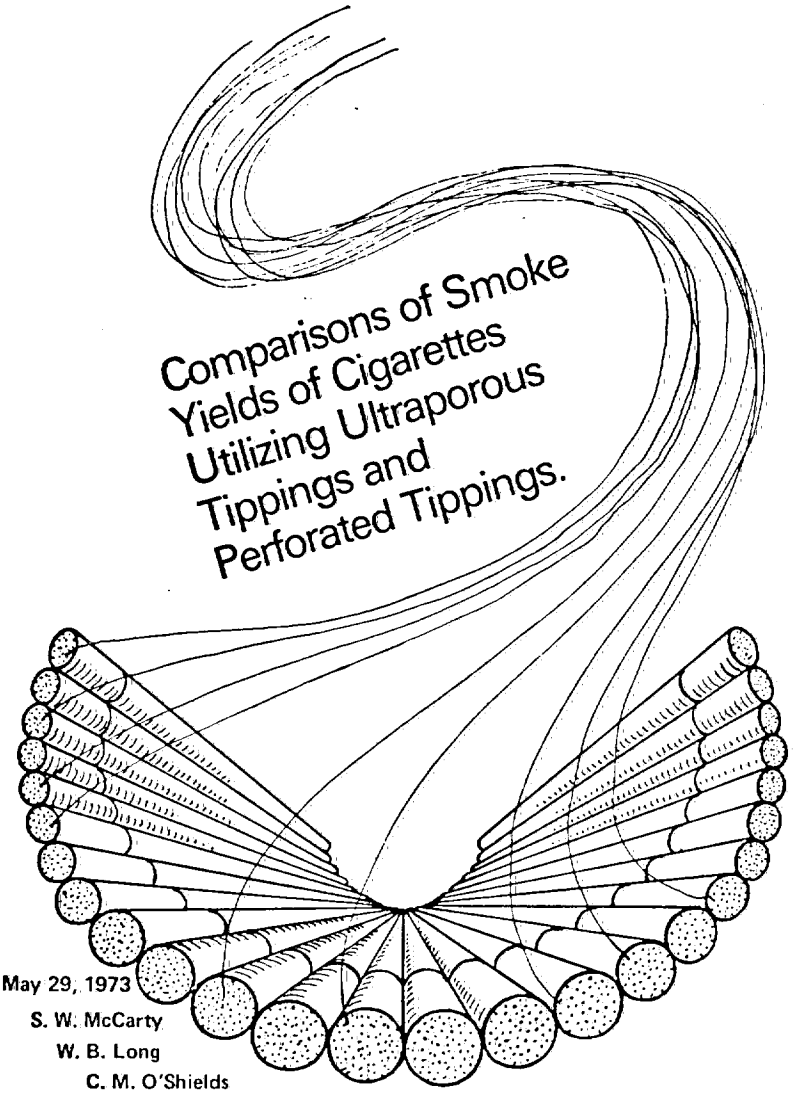
RESEARCH & DEVELOPMENT DEPT. REPORT...



Comparisons of Smoke Yields of Cigarettes Utilizing Ultraporous Tippings and Perforated Tippings.

May 29, 1973

S. W. McCarty
W. B. Long
C. M. O'Shields

ECUSTA PAPER DIVISION Olin
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COMPARISONS OF SMOKE YIELDS OF CIGARETTES UTILIZING ULTRAPOROUS TIPPINGS AND PERFORATED TIPPINGS

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INTRODUCTION

In recent years air dilution around the filter tips of cigarettes has become a popular and widely-used method of reducing the smoke yield from cigarettes. The prevalent way of accomplishing this air dilution effect has been through the use of perforated tippings which are products having discrete holes through which air is pulled to dilute the mainstream smoke. With the recent development of Ecusta's ultraporous tipping paper, an additional way to effect air dilution is possible, in that the air can be pulled through the porous tipping without obvious, discrete holes being visible.

The purpose of this present study has been to investigate under controlled laboratory conditions the smoke yields from cigarettes utilizing various combinations of ultraporous tippings and porous plug wraps and to compare these smoke yields with those obtained from cigarettes using perforated tippings as a means of air dilution.

EXPERIMENTAL

Tobacco columns made from a typical commercial tobacco blend were cut to 75 mm lengths for this study and conditioned at 72°F, 62% R. H. for 24 hours. These tobacco columns were then tipped with 25 mm filters, made from 4.2 dpf/40,000 td cellulose acetate tow, having a pressure drop with nonporous plug wrap of 2.1 inches of water/25 mm.

Ecusta ultraporous tippings, perforated tippings, and porous plug wraps were used to prepare the filter rods and finished cigarettes. Control cigarettes were prepared using ultraporous and perforated tippings in conjunction with nonporous Type A plug wrap which was determined to give no air dilution effect.

The cigarettes were tipped leaving various unglued widths, 5 mm, 10 mm or 15 mm, centered 12.5 mm from the mouth end of the cigarette as shown in Figure 1.

The cigarettes were smoked to within 5 mm of the tipping (65 mm smoked), and the smoke yields were determined by standard FTC procedures.

DISCUSSION

The porosity data for the various porous plug wraps and ultraporous tippings are given in Table I. Smoke yields and related data are given in Tables II-IV and depicted graphically in Figures 2-7.

As evidenced by the tables and graphs, the tar yields from cigarettes utilizing ultraporous tippings decrease as (1) the tipping paper becomes more porous, (2) the plug wrap becomes more porous, or (3) the unglued area of the tipping is increased. Nicotine, although not shown graphically, follows the same trend as can be seen from Tables II-IV. The tar and nicotine yields are fairly well related to the cigarette pressure drop.

Smoke yield reductions of up to 75% were achieved in this study. The unglued areas of the tippings were not unreasonably large for normal cigarette production and could probably be used commercially without undue difficulty. It is obvious that a wide range of smoke yield reductions can be achieved with the proper selection of porous plug wrap and ultraporous tipping.

Of obvious interest in this study is the comparison of the effects on smoke yields of ultraporous tippings and perforated tippings since these materials are both used to achieve air dilution at the cigarette filter tip. The smoke yields obtained using one-line, three-line, and six-line perforated tippings are given in Table V and shown graphically in Figures 8 and 9.

It can be seen from comparing these data for perforated and ultraporous tippings that comparable smoke yields can be obtained by either approach with the appropriate selection of tipping and plug wrap. For example, tar yield reductions of approximately 20% were obtained by:

(1) 3-line perforated tipping / Type C plug wrap,

(2) ultraporous tipping #1 (10 mm unglued area) / Type C plug wrap, or

(3) ultraporous tipping #3 (10 mm unglued area) / Type B plug wrap.

For one further example, an approximate 50% tar reduction was obtained by:

(1) 6-line perforated tipping / Type D plug wrap,

(2) ultraporous tipping #2 (15 mm unglued area) / Type E perforated plug wrap, or

(3) ultraporous tipping #3 (10 mm unglued area) / Type D plug wrap.

In other words, a large range of smoke yield reductions is possible with either perforated tippings or ultraporous tippings with the appropriate selection of porous plug wraps.

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CONCLUSION

Smoke yields from cigarettes utilizing ultraporous tippings have been measured and found to be comparable to those obtained from commonly used perforated tippings. A wide range of tar and nicotine reductions was obtained (5%-75%) with the appropriate selection of ultraporous tipping, unglued porous area and porous plug wrap.

TABLE I

POROSITY DATA FOR TIPPING PAPERS AND PLUG WRAPS USED IN THIS STUDY

Paper Identification	Porosity (Inches / 50 cc / sec)*
Ultraporous Tipping No. 1	12.7
Ultraporous Tipping No. 2	4.6
Ultraporous Tipping No. 3	1.6
One-Line Perforated Tipping	8.2
Three-Line Perforated Tipping	1.2
Six-Line Perforated Tipping	0.4
Type A Nonporous Plug Wrap	Nonporous
Type B Porous Plug Wrap	8.2
Type C Porous Plug Wrap	3.1
Type D Porous Plug Wrap	1.2
Type E Perforated Plug Wrap	0.1

* These porosity values were obtained by measuring the pressure drop in inches of water across a single thickness of the paper associated with passing a constant air flow of 50 cc / sec through a 5 cm^2 area of the paper.

TABLE II

SMOKE YIELDS – ULTRAPOROUS TIPPING NO. 1*

Plug Wrap	Unglued Width (mm)	Cigarette Pressure Drop (in. H_2O)	No. Puffs (per cig.)	Wet TPM (mg/cig.)	Water (mg/cig.)	Dry TPM (mg/cig.)	Nicotine (mg/cig.)	Tar (mg/cig.)	Tar Reduction by Air Dilution (%/cig.)	Tar (mg/puff)
Type A	5	3.7	10.3	23.3	2.9	20.4	1.4	19.0	-	1.84
Type A	10	3.6	10.5	22.9	2.4	20.5	1.4	19.1	-	1.82
Type A	15	3.8	10.3	23.1	2.5	20.6	1.4	19.2	-	1.86
Type B	5	3.6	10.7	21.9	3.3	18.6	1.3	17.3	9	1.62
Type B	10	3.2	10.8	19.4	2.7	16.7	1.3	15.4	19	1.43
Type B	15	3.1	11.3	17.5	1.8	15.7	1.2	14.5	24	1.28
Type C	5	3.5	10.5	20.2	1.9	18.3	1.3	17.0	11	1.62
Type C	10	3.3	10.7	18.5	2.0	16.5	1.3	15.2	20	1.42
Type C	15	3.0	11.6	16.9	1.7	15.2	1.2	14.0	27	1.21
Type D	5	3.3	10.9	17.1	1.3	15.8	1.3	14.5	24	1.33
Type D	10	3.1	11.2	16.2	1.4	14.8	1.2	13.6	29	1.21
Type D	15	2.8	11.3	14.0	0.6	13.4	1.1	12.3	36	1.09
Type E	5	3.3	11.0	16.6	1.0	15.6	1.3	14.3	25	1.30
Type E	10	3.0	11.7	16.0	1.2	14.8	1.2	13.6	29	1.16
Type E	15	2.7	11.7	14.1	0.8	13.3	1.1	12.2	36	1.04

*Average Porosity = 12.7 inches / 50 cc / sec

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TABLE III

SMOKE YIELDS – ULTRAPOROUS TIPPING NO. 2 *

Plug Wrap	Unglued Width (mm)	Cigarette Pressure Drop (in. H_2O)	No. Puffs (per cig.)	Wet TPM (mg/cig.)	Water (mg/cig.)	Dry TPM (mg/cig.)	Nicotine (mg/cig.)	Tar (mg/cig.)	Tar Reduction by Air Dilution (%/cig.)	Tar (mg/puff)
Type A	5	3.8	10.7	24.9	3.2	21.7	1.5	20.2	-	1.90
Type A	10	3.7	9.8	22.9	2.6	20.3	1.4	18.9	-	1.93
Type A	15	3.8	9.8	23.8	2.5	21.3	1.4	19.9	-	2.03
Type B	5	3.5	10.3	21.9	2.2	19.7	1.4	18.3	7	1.78
Type B	10	3.1	10.7	18.6	1.5	17.1	1.2	15.9	19	1.49
Type B	15	2.8	10.8	17.5	2.7	14.8	1.1	13.7	30	1.27
Type C	5	3.2	10.8	19.7	2.0	17.7	1.2	16.5	16	1.53
Type C	10	2.8	10.9	18.0	1.2	16.8	1.1	15.7	20	1.44
Type C	15	2.6	11.3	15.9	1.4	14.5	1.0	13.5	31	1.19
Type D	5	3.1	10.9	18.4	1.4	17.0	1.1	15.9	19	1.46
Type D	10	2.7	11.4	16.5	1.0	15.5	1.0	14.5	26	1.27
Type D	15	2.4	11.4	13.8	0.4	13.4	0.9	12.5	37	1.10
Type E	5	3.2	10.7	18.7	2.2	16.5	1.1	15.4	22	1.44
Type E	10	2.5	11.3	15.7	0.9	14.8	1.0	13.8	30	1.18
Type E	15	2.1	11.7	11.9	0.3	11.6	0.8	10.8	45	0.92

*Average Porosity = 4.6 inches / 50 cc / sec

TABLE IV

SMOKE YIELDS – ULTRAPOROUS TIPPING NO. 3 *

Plug Wrap	Unglued Width (mm)	Cigarette Pressure Drop (in. H_2O)	No. Puffs (per cig.)	Wet TPM (mg/cig.)	Water (mg/cig.)	Dry TPM (mg/cig.)	Nicotine (mg/cig.)	Tar (mg/cig.)	Tar Reduction by Air Dilution (%/cig.)	Tar (mg/puff)
Type A	5	4.0	10.6	23.9	3.5	20.4	1.5	18.9	-	1.78
Type A	10	3.9	10.7	25.0	3.7	21.3	1.6	19.7	-	1.84
Type A	15	4.0	10.7	22.5	2.5	20.0	1.4	18.6	-	1.74
Type B	5	3.3	10.6	20.2	1.8	18.4	1.3	17.1	10	1.61
Type B	10	3.0	11.1	18.1	2.0	16.1	1.2	14.9	22	1.34
Type B	15	2.8	11.0	16.3	1.3	15.0	1.1	13.9	27	1.26
Type C	5	2.9	10.7	18.9	1.6	17.3	1.3	16.0	16	1.50
Type C	10	2.7	11.1	16.5	1.5	15.0	1.2	13.8	28	1.24
Type C	15	2.3	11.4	13.9	0.7	13.2	0.8	12.4	35	1.09
Type D	5	2.8	11.4	16.6	1.5	15.1	1.2	13.9	27	1.22
Type D	10	2.2	11.7	12.6	1.4	11.2	1.0	10.2	47	0.87
Type D	15	1.8	12.2	8.0	0.6	7.4	0.7	6.7	65	0.55
Type E	5	2.3	11.7	13.4	1.2	12.2	1.0	11.2	41	0.96
Type E	10	1.9	12.7	9.3	0.6	8.7	0.8	7.9	59	0.62
Type E	15	1.5	12.7	5.1	0	5.1	0.4	4.7	75	0.37

* Average porosity = 1.6 inches / 50 cc / sec.

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TABLE V

SMOKE YIELDS – PERFORATED TIPPING

Plug Wrap	Lines of Perforations	Cigarette Pressure Drop (in.H_2O)	No. Puffs (per cig.)	Wet TPM (mg/cig.)	Water (mg/cig.)	Dry TPM (mg/cig.)	Nicotine (mg/cig.)	Tar (mg/cig.)	Tar Reduction by Air Dilution (%/cig.)	Tar (mg/puff)
Type A	1	4.0	11.2	24.8	3.0	21.8	1.3	20.5	-	1.83
Type A	3	4.0	11.0	24.3	3.0	21.3	1.3	20.0	-	1.81
Type A	6	4.0	10.9	25.3	3.3	22.0	1.4	20.6	-	1.89
Type B	1	3.7	11.2	20.4	1.4	19.0	1.2	17.8	13	1.59
Type B	3	3.4	11.9	20.1	1.7	18.4	1.1	17.3	15	1.45
Type B	6	3.2	12.0	18.1	0.9	17.2	1.0	16.2	21	1.35
Type C	1	3.7	11.7	20.4	1.9	18.5	1.2	17.3	15	1.48
Type C	3	3.2	11.9	18.7	1.9	16.8	1.1	15.7	23	1.32
Type C	6	2.8	12.4	15.4	1.0	14.4	0.9	13.5	34	1.09
Type D	1	3.2	12.0	17.5	1.4	16.1	1.0	15.1	26	1.26
Type D	3	2.6	12.4	13.4	0.3	13.1	0.8	12.3	40	0.99
Type D	6	2.4	12.1	10.9	0.5	10.4	0.7	9.7	52	0.80
Type E	1	3.1	12.0	15.5	1.0	14.5	1.0	13.5	34	1.13
Type E	3	2.2	13.2	8.7	0.2	8.5	0.6	7.9	61	0.60
Type E	6	1.8	14.3	4.3	0.3	4.0	0.3	3.7	82	0.26

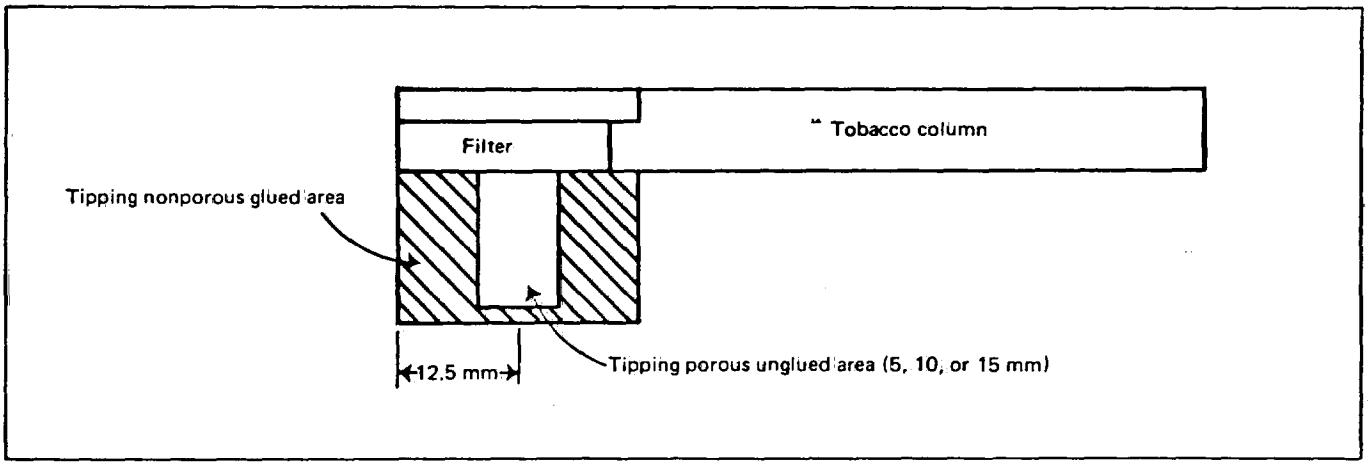

FIGURE 1 DIAGRAM OF EXPERIMENTAL CIGARETTE UTILIZING ULTRAPOROUS TIPPING

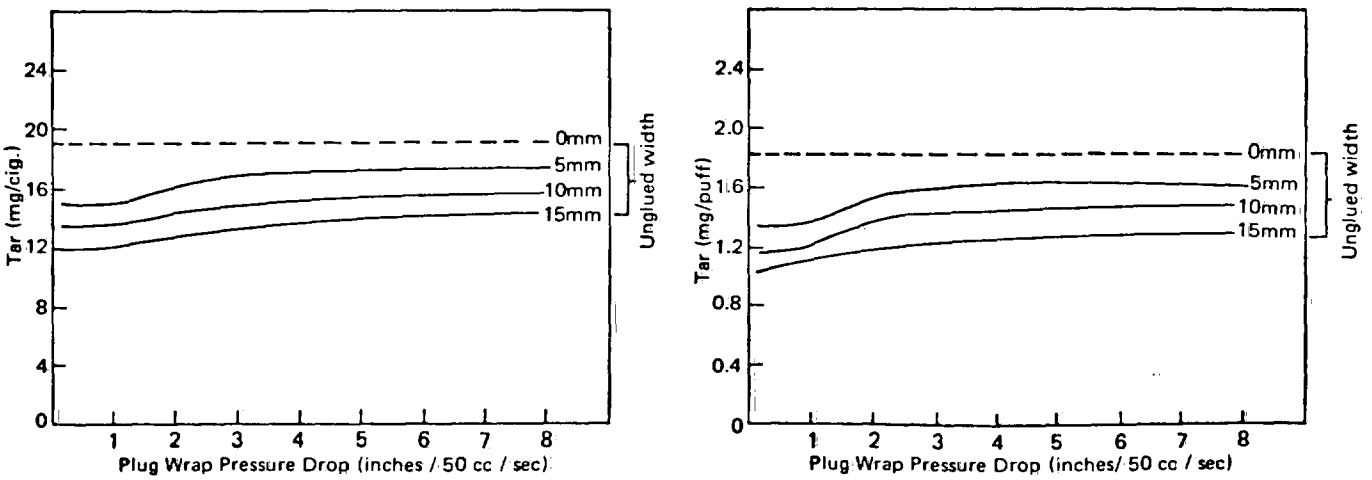

FIGURE 2 SMOKE YIELD AS A FUNCTION OF PLUG WRAP POROSITY FOR ULTRAPOROUS TIPPING NO. 1

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Source: https://www.industrydocuments.ucsf.edu/docs/fmfn0000

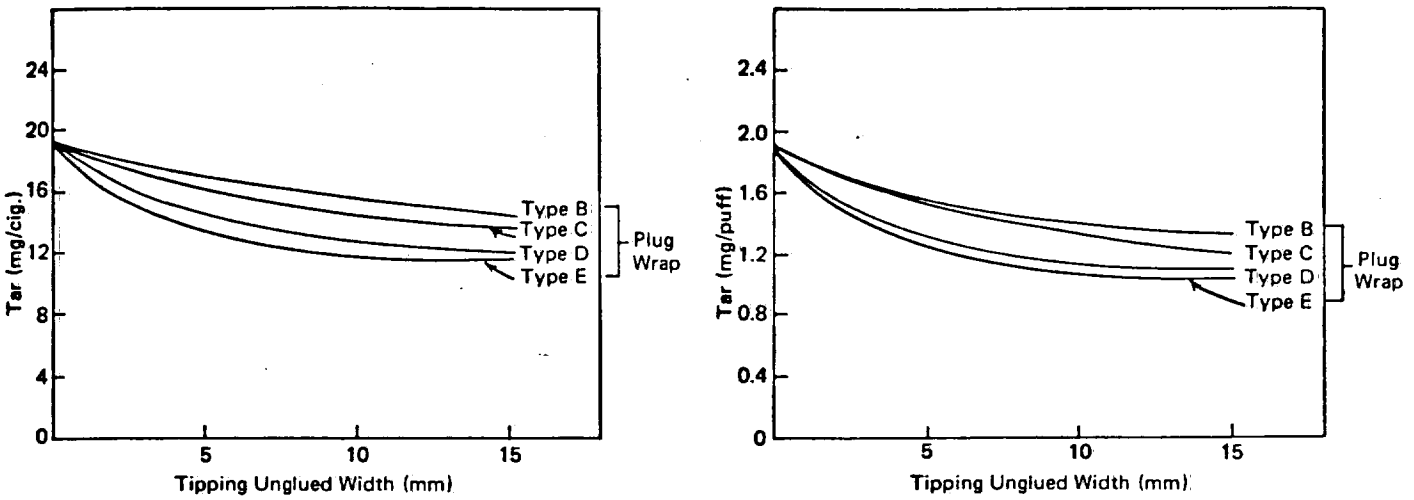

FIGURE 3 SMOKE YIELD AS A FUNCTION OF THE UNGLUED WIDTH FOR ULTRAPOROUS TIPPING NO. 1

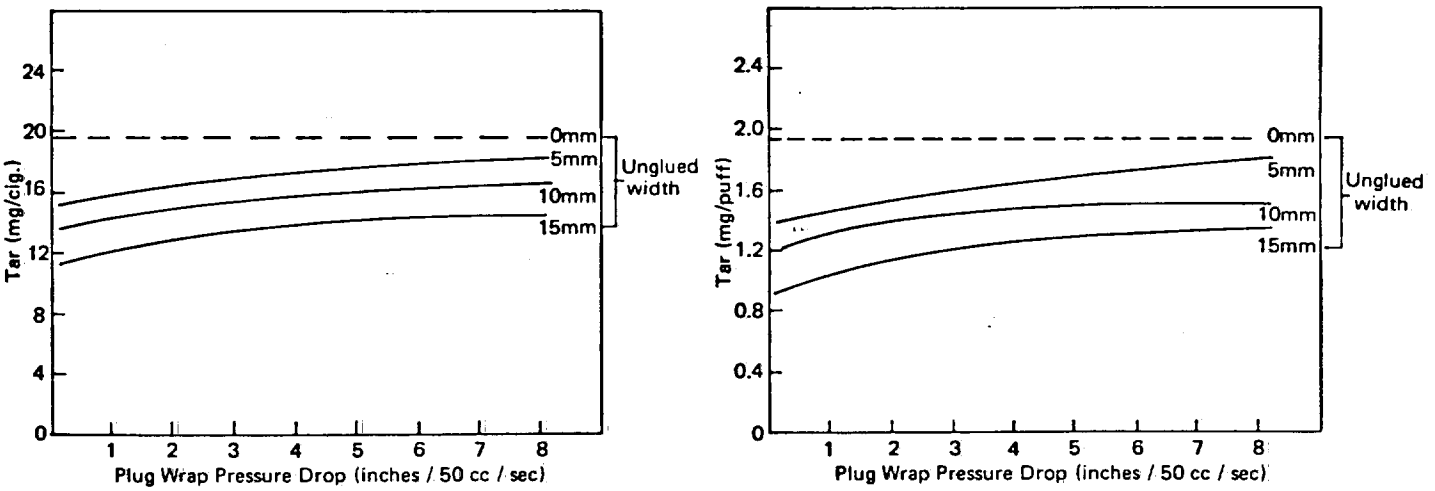

FIGURE 4 SMOKE YIELD AS A FUNCTION OF PLUG WRAP POROSITY FOR ULTRAPOROUS TIPPING NO. 2

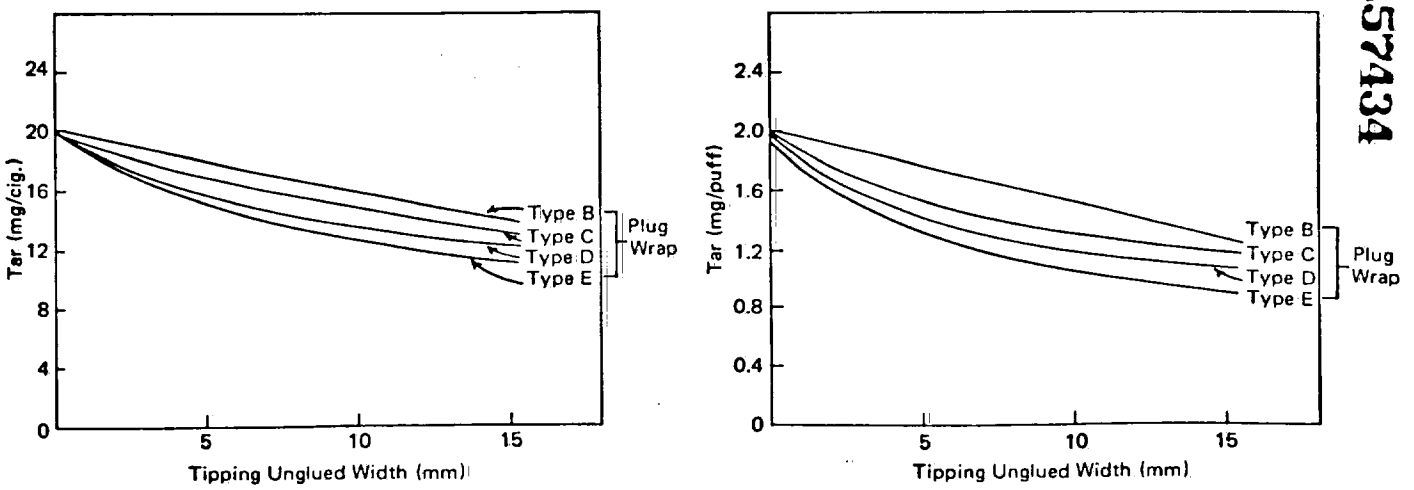

FIGURE 5 SMOKE YIELD AS A FUNCTION OF THE UNGLUED WIDTH FOR ULTRAPOROUS TIPPING NO. 2

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Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000

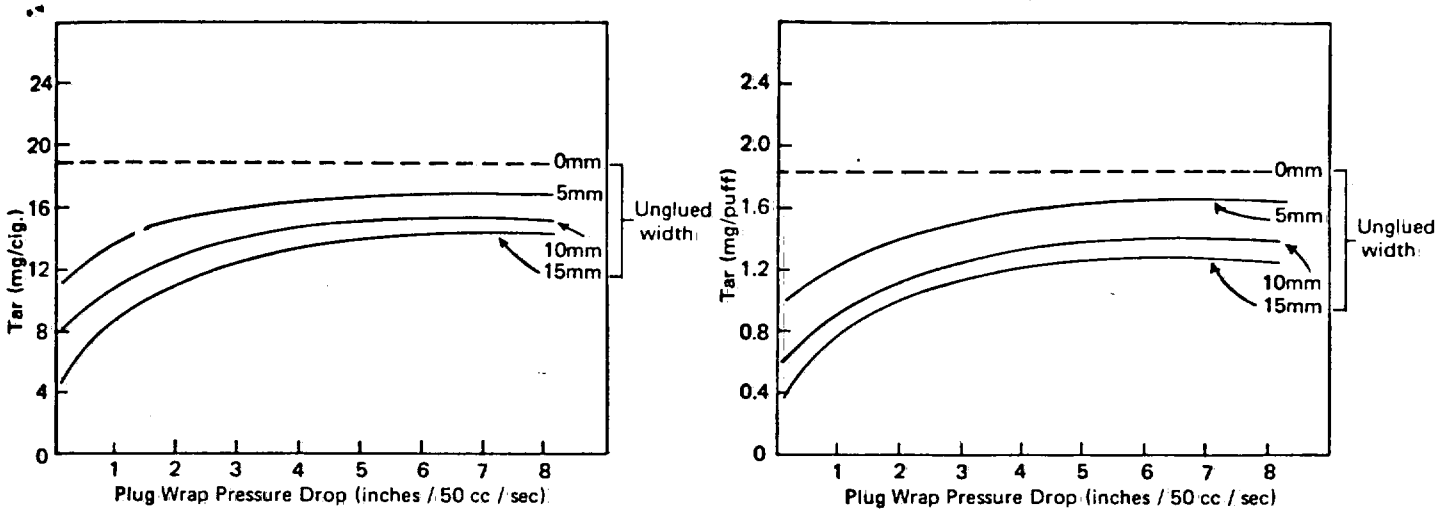

FIGURE 6 SMOKE YIELD AS A FUNCTION OF PLUG WRAP POROSITY FOR ULTRAPOROUS TIPPING NO. 3

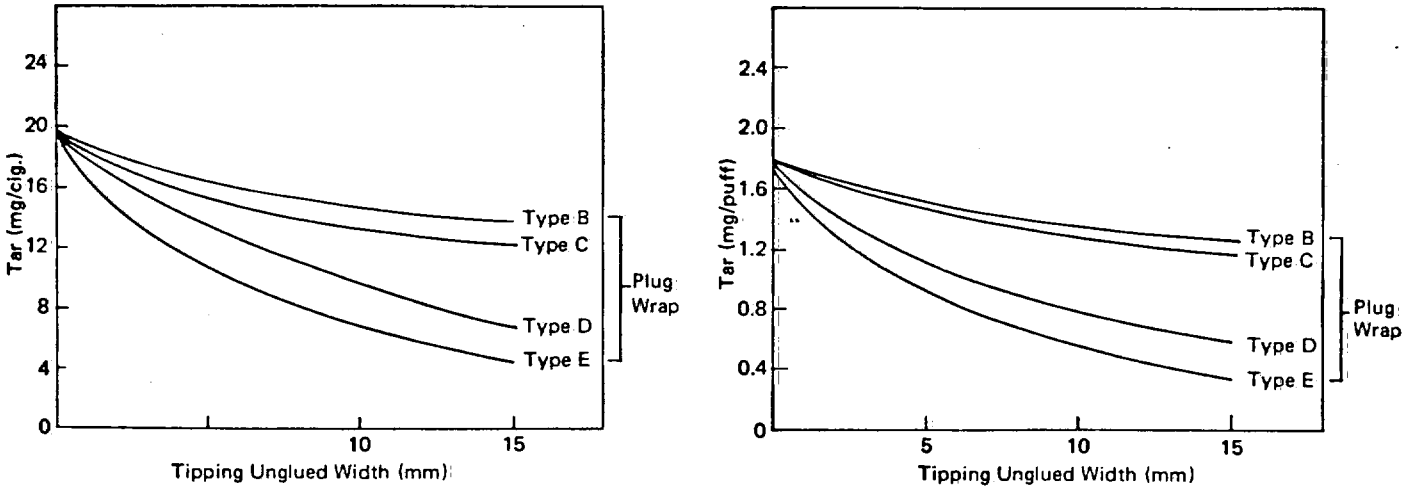

FIGURE 7 SMOKE YIELD AS A FUNCTION OF THE UNGLUED WIDTH FOR ULTRAPOROUS TIPPING NO. 3

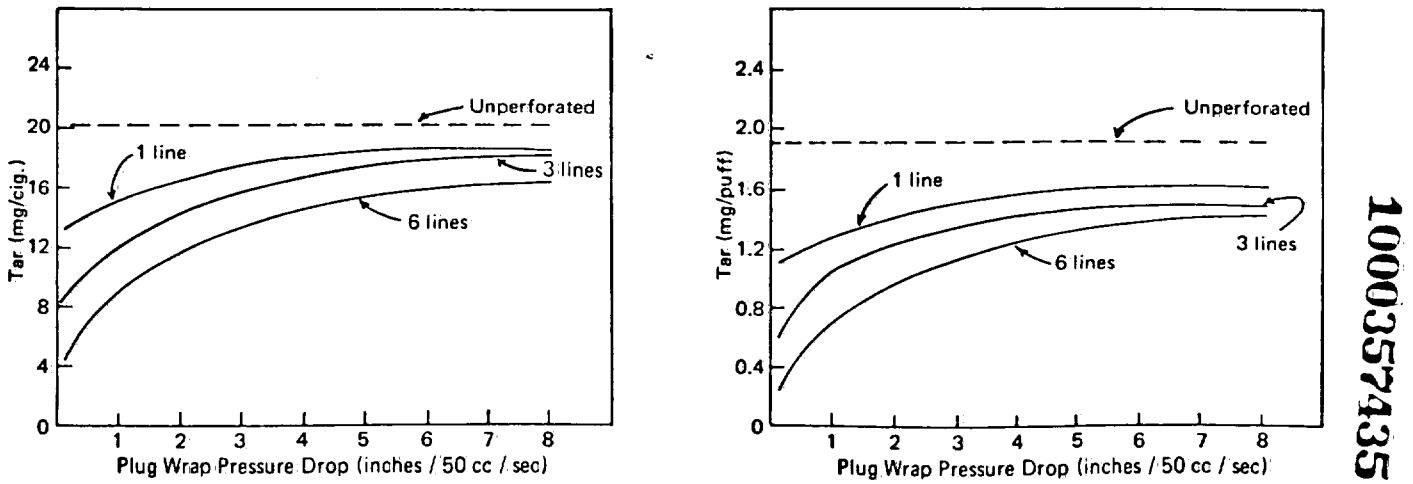

FIGURE 8 SMOKE YIELDS AS A FUNCTION OF PLUG WRAP POROSITY FOR PERFORATED TIPPING

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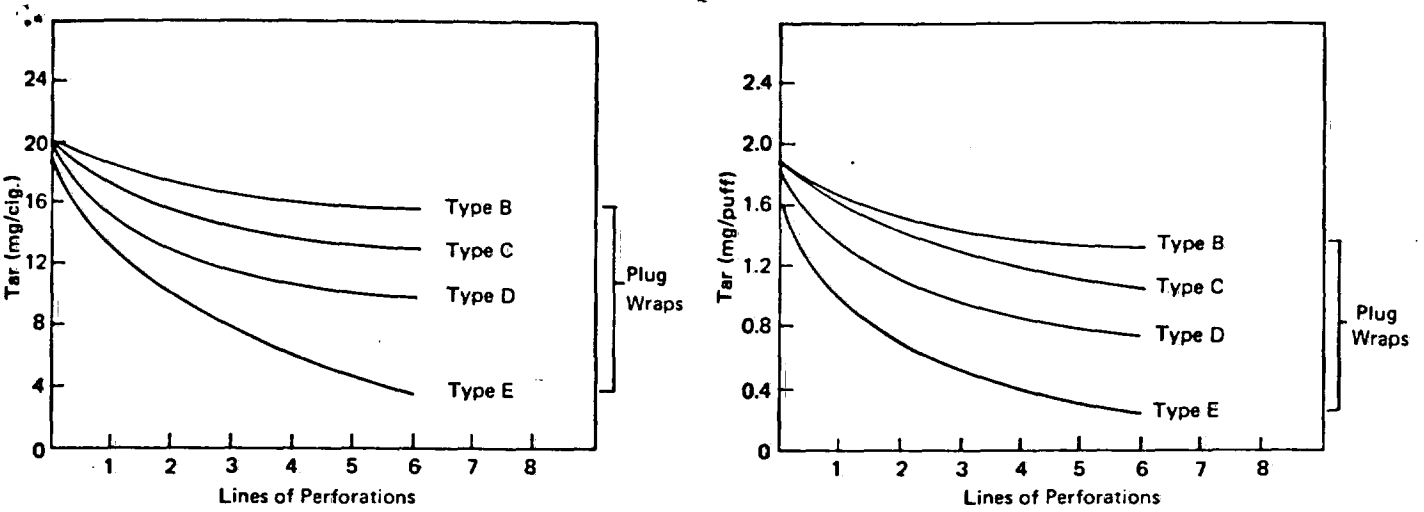

FIGURE 9 SMOKE YIELDS AS A FUNCTION OF NUMBER OF PERFORATED TIPPING LINES

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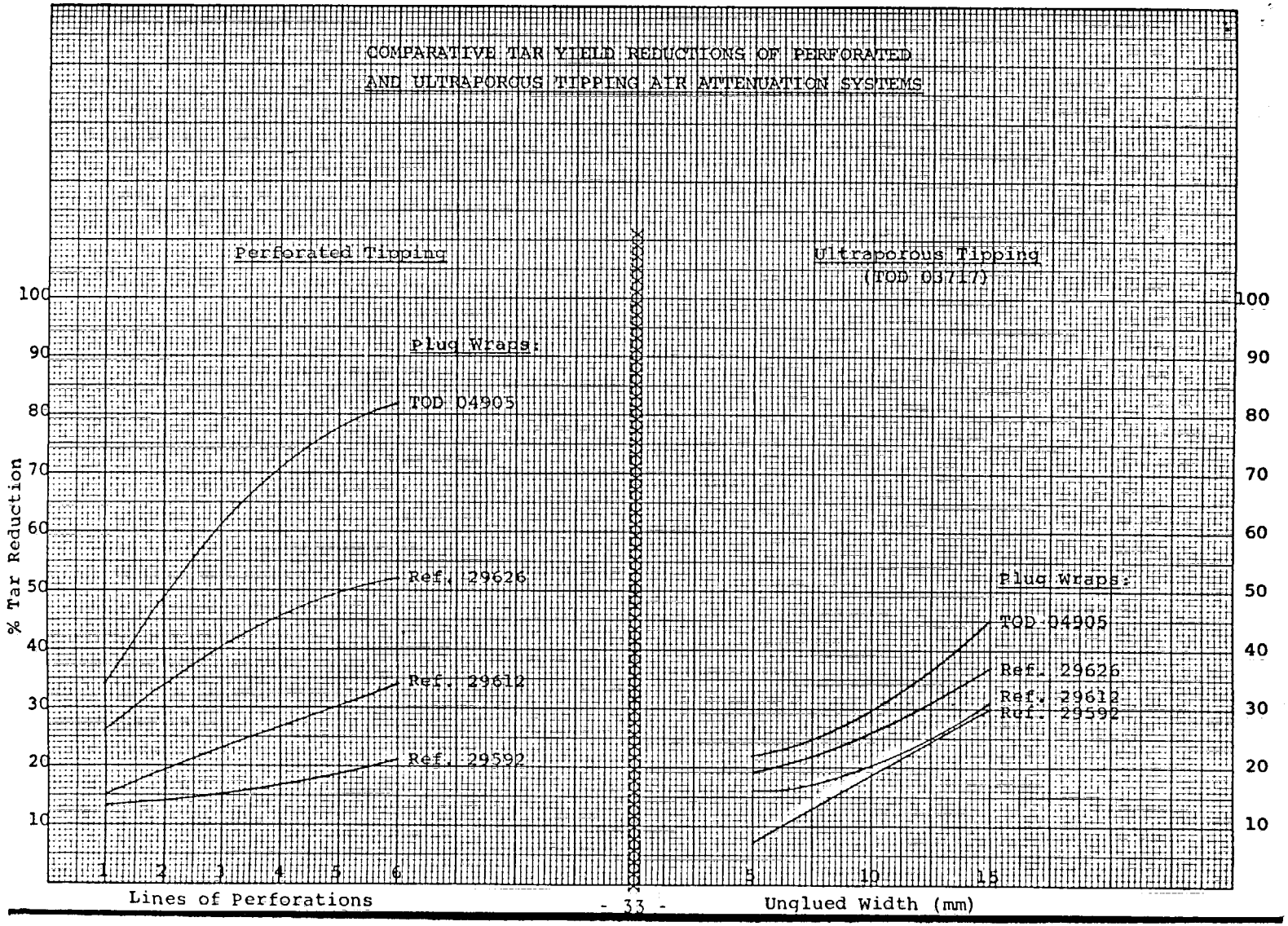
K•E 10 X 10 TO THE ½ INCH KEUFFEL & ESSER CO. 358-12 MADE IN U.S.A.



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APPENDIX III

PRINTER ROLL PROCESS DRAWINGS

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FIGURE I

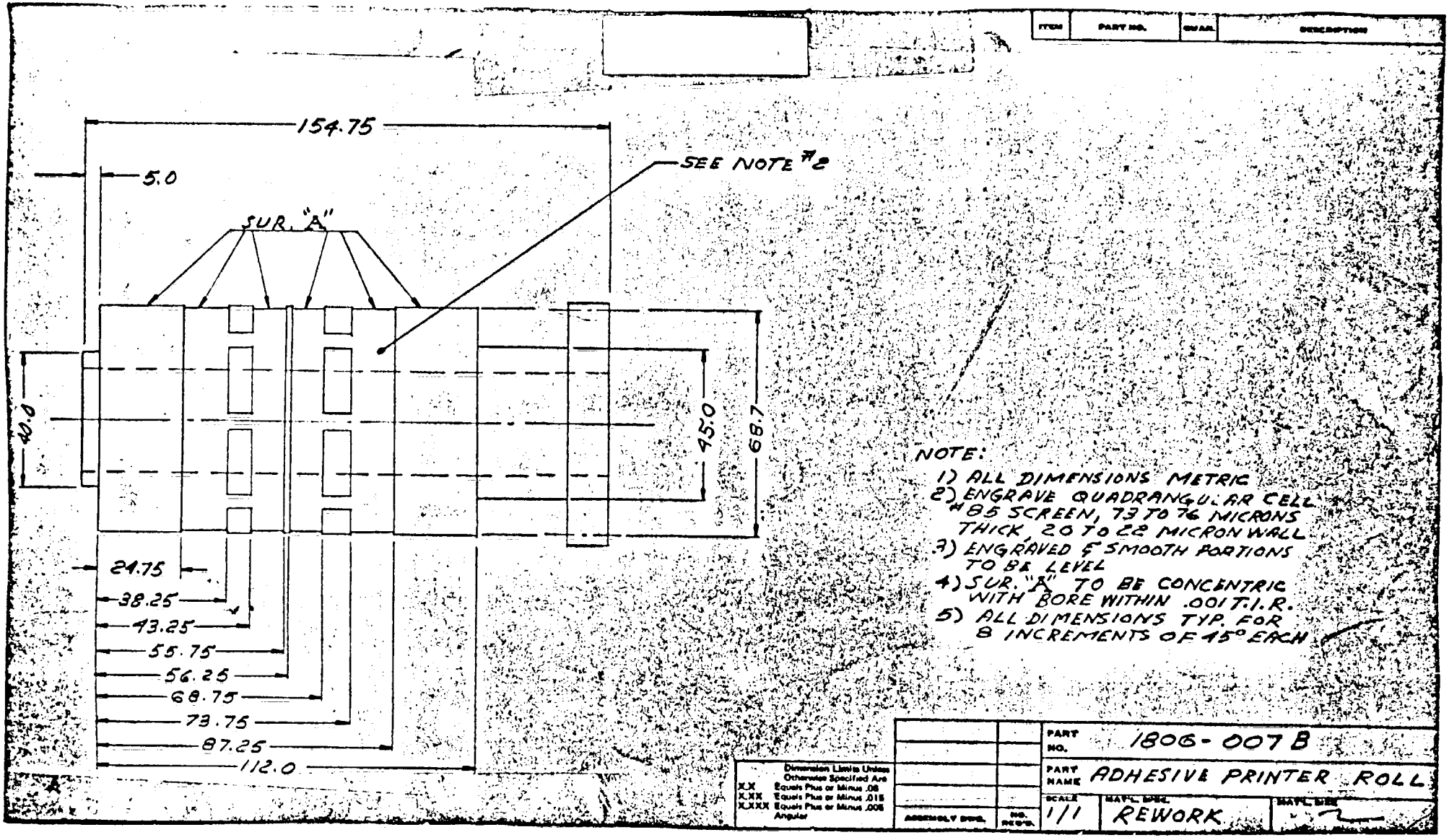

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FIGURE II

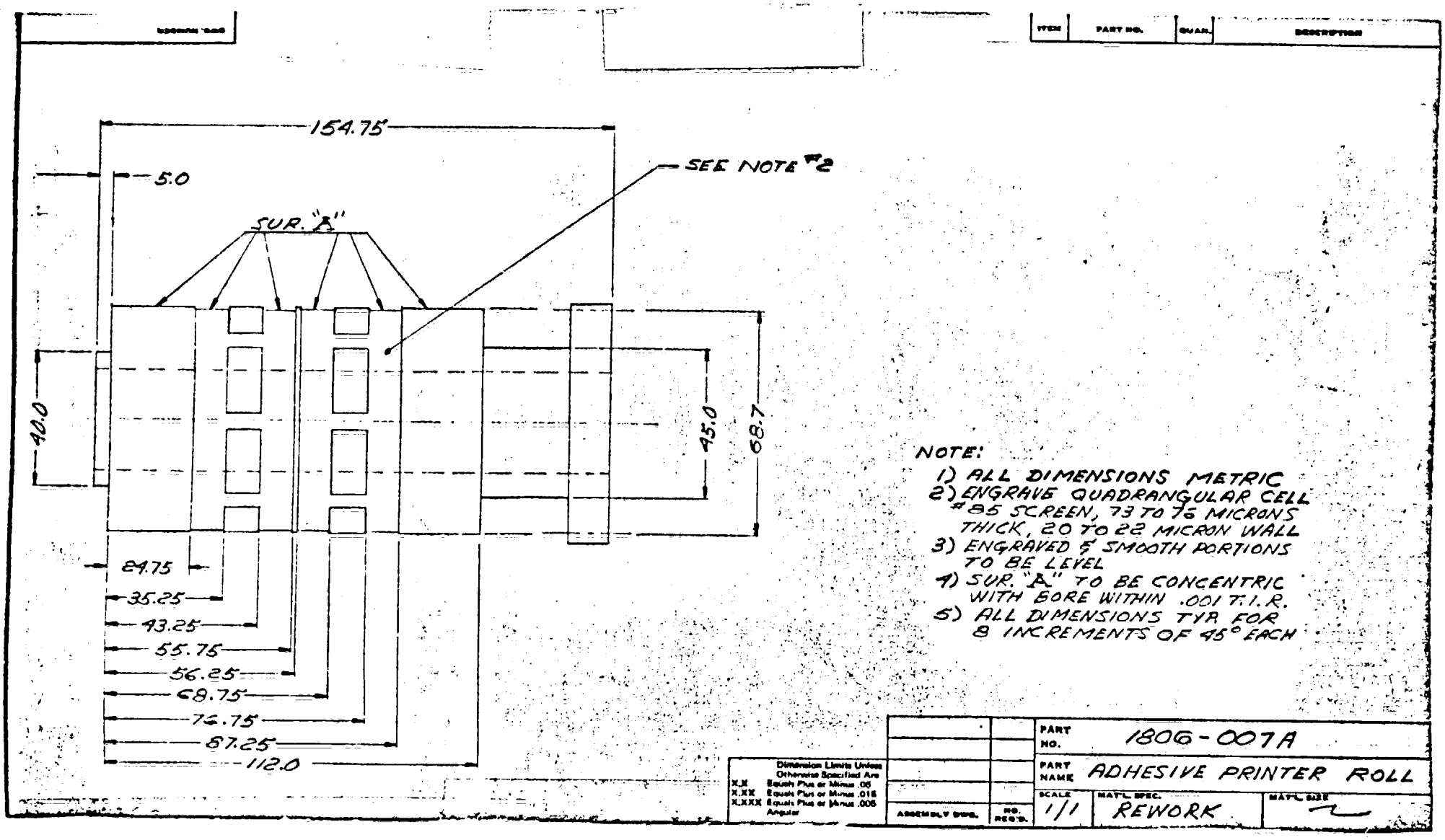

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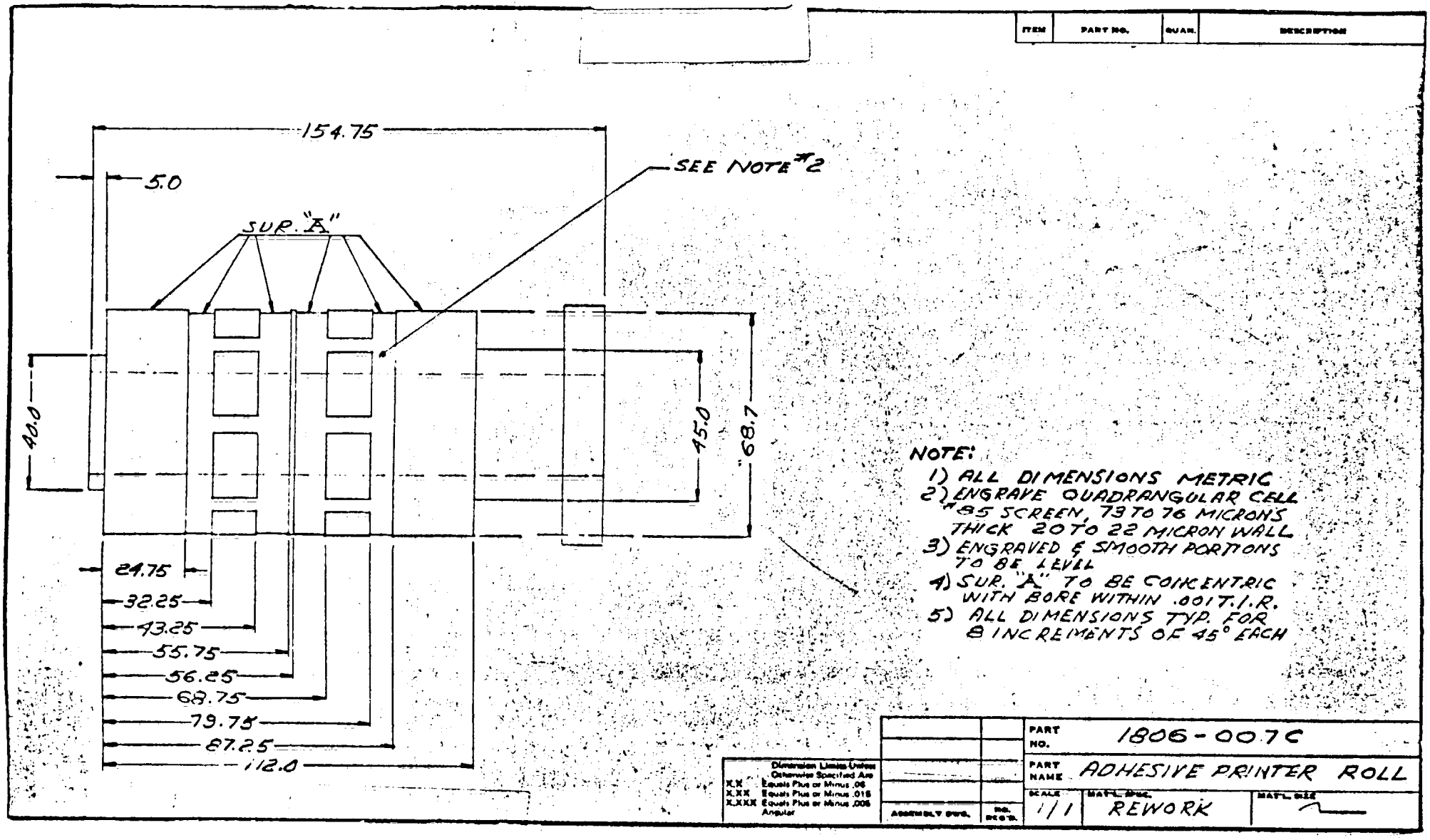
FIGURE III



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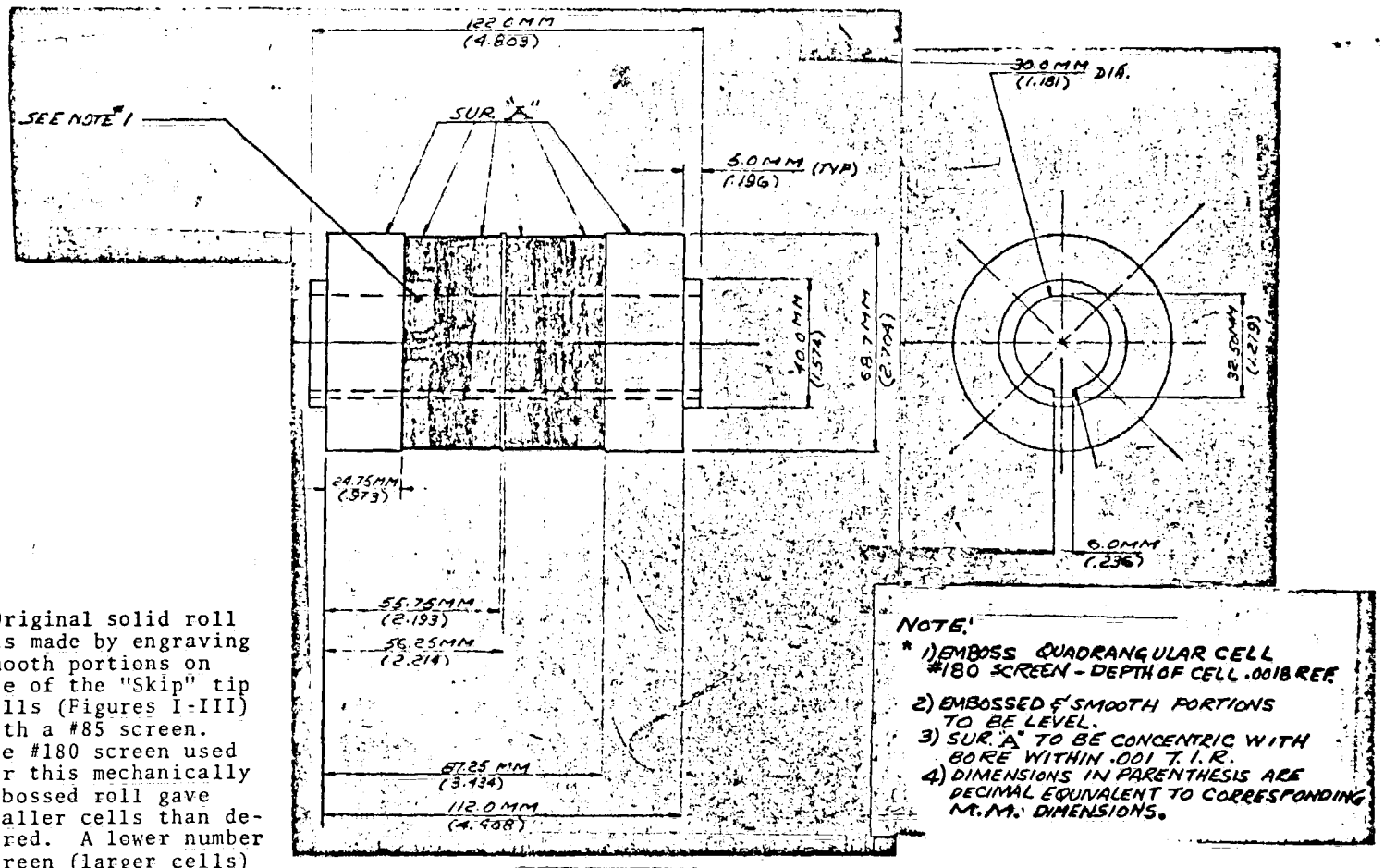

*Original solid roll was made by engraving smooth portions on one of the "Skip" tip rolls (Figures I-III) with a #85 screen. The #180 screen used for this mechanically embossed roll gave smaller cells than desired. A lower number screen (larger cells) would give more and better adhesive application.

FIGURE IV

		PART NO.	1806-009
		PART NAME	ADHESIVE PRINTER ROLL
		SCALE 1/1	REVISE LEVEL REWORK

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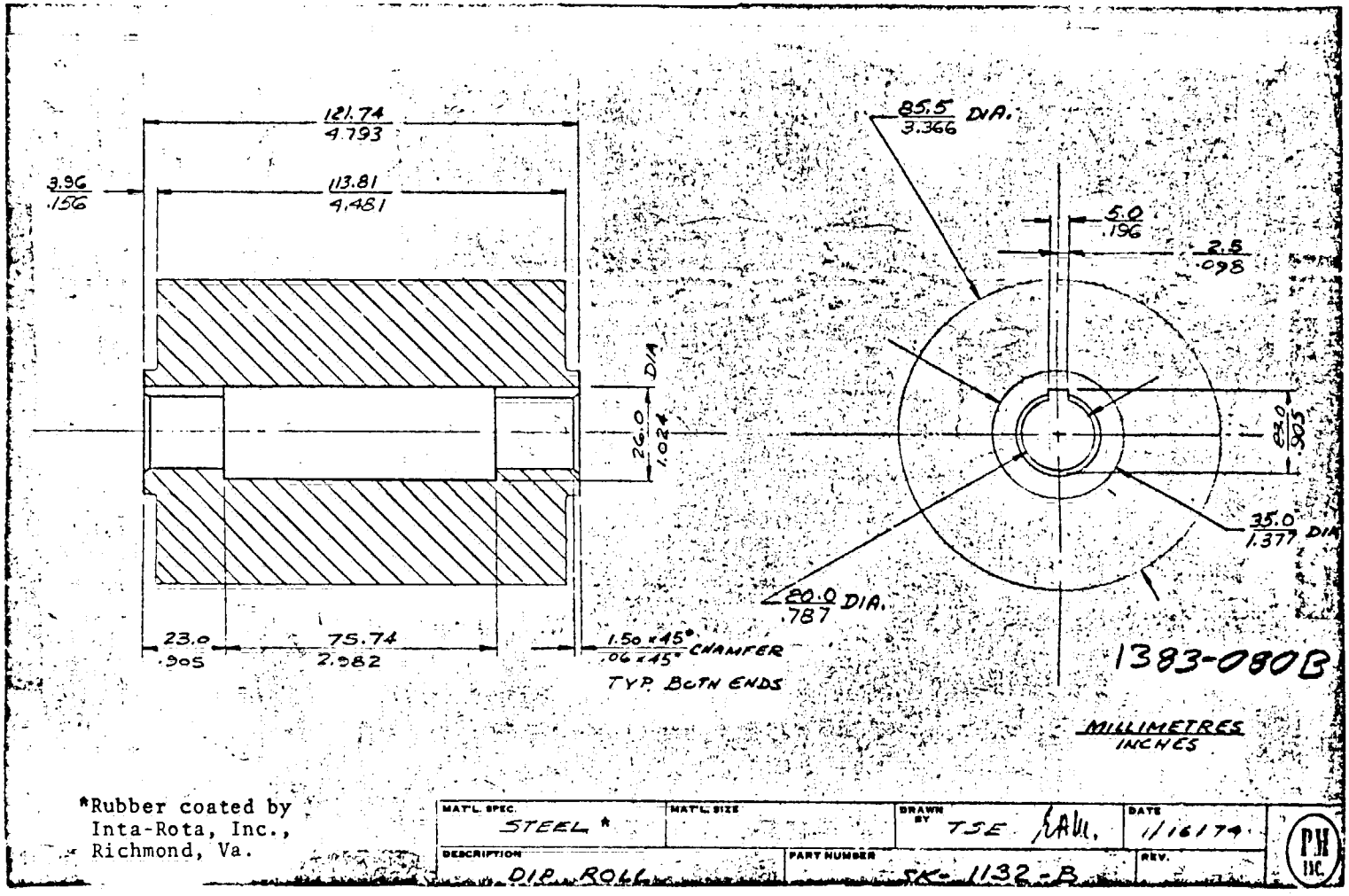
FIGURE V



*Rubber coated by Inta-Rota, Inc., Richmond, Va.

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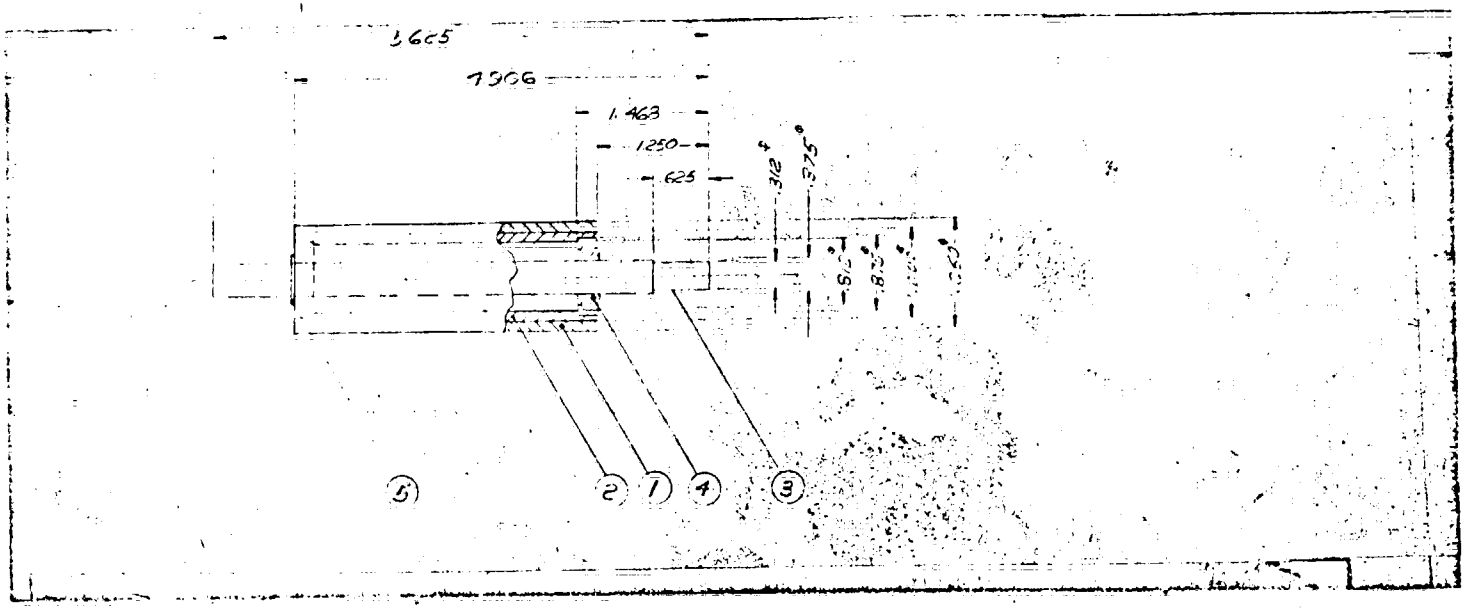
FIGURE VI



ITEM	PART NO.	QUAN.	DESCRIPTION
1	RUBBER		55 DURAMETER
2	[illegible]	1	[illegible]
3	[illegible]	1	[illegible]
4	[illegible]	2	FEDERAL # [illegible]
5	[illegible]	2	[illegible]

Dimension Limits Unless Otherwise Specified Are
Equals Plus or Minus .08
Equals Plus or Minus .016
Equals Plus or Minus .005
Angular

ASSEMBLY NO. | NO. REQ'D

PART NO. [illegible]
PART NAME [illegible]
SCALE 1/1 | MAT'L SPEC. NOTED | MAT'L SIZE [illegible]

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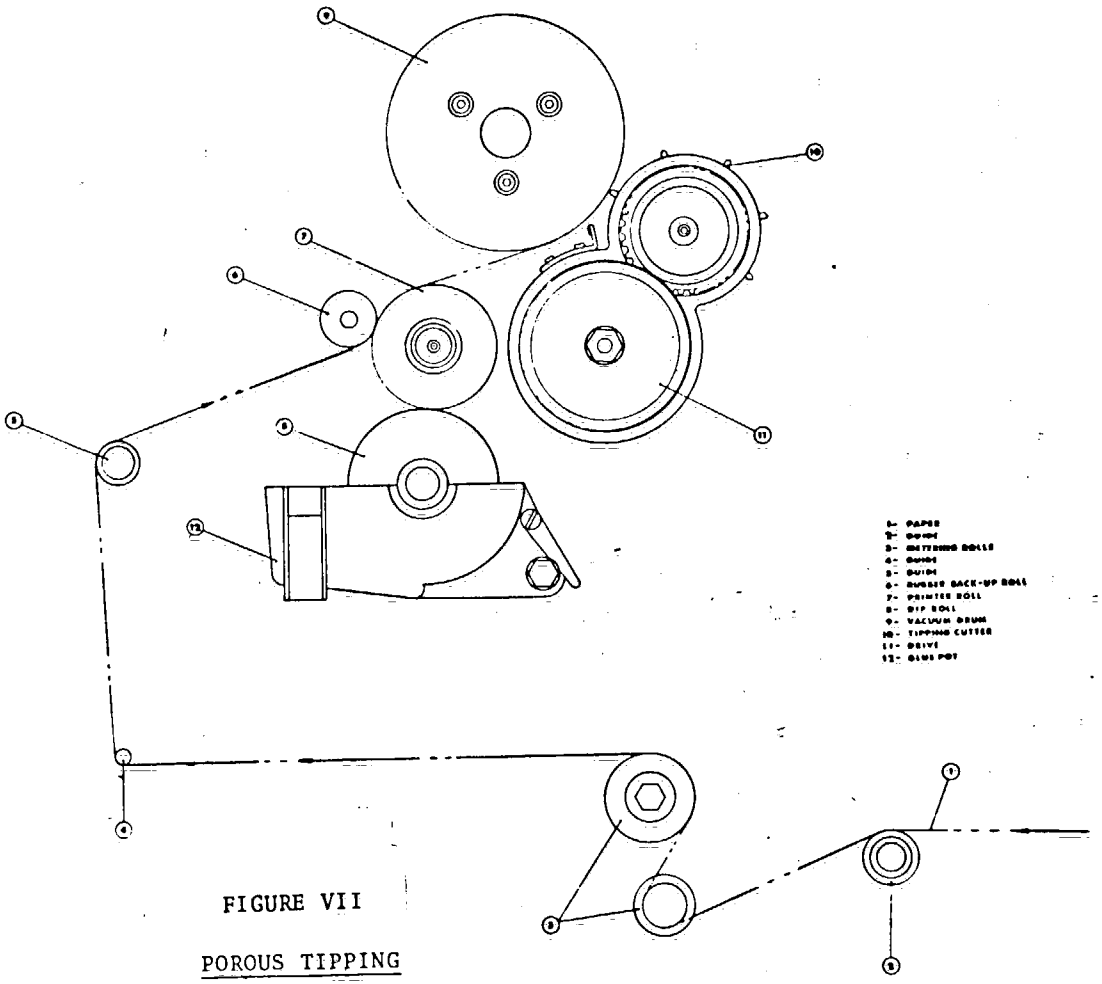

FIGURE VII

POROUS TIPPING
ADHESIVE APPLICATION SYSTEM
GRAVURE PRINTER ROLL SET-UP

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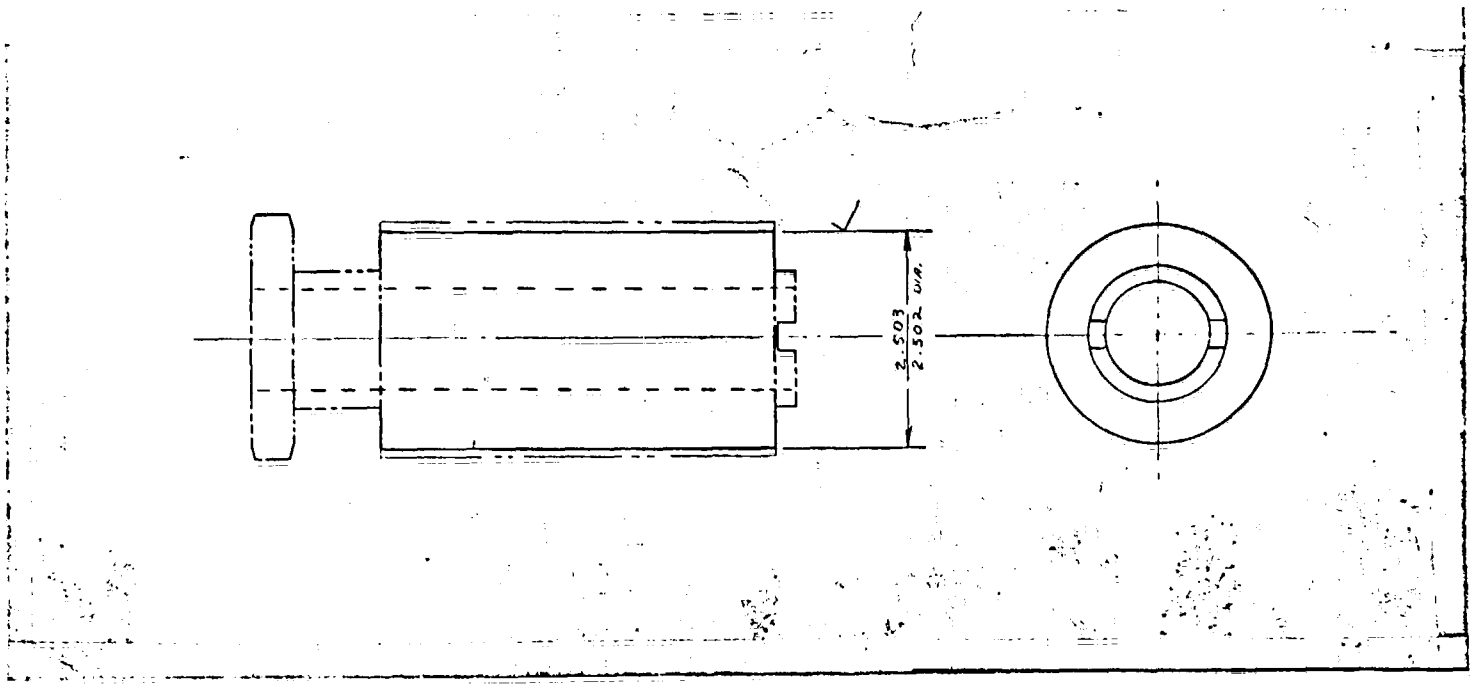
Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000

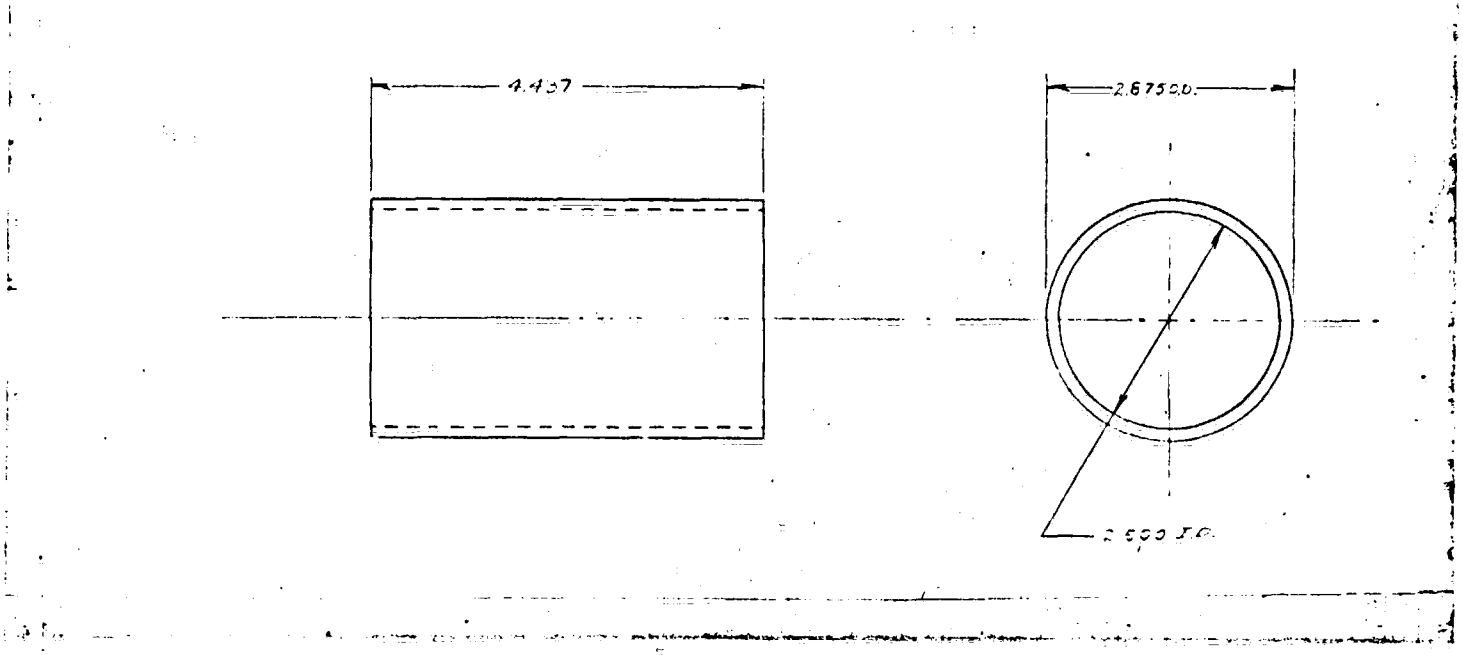
FIGURE VIII



PART NO. 1806-006 B
PART NAME PRINTER ROLL MOD.
SCALE 1:1

1000357446

FIGURE IX



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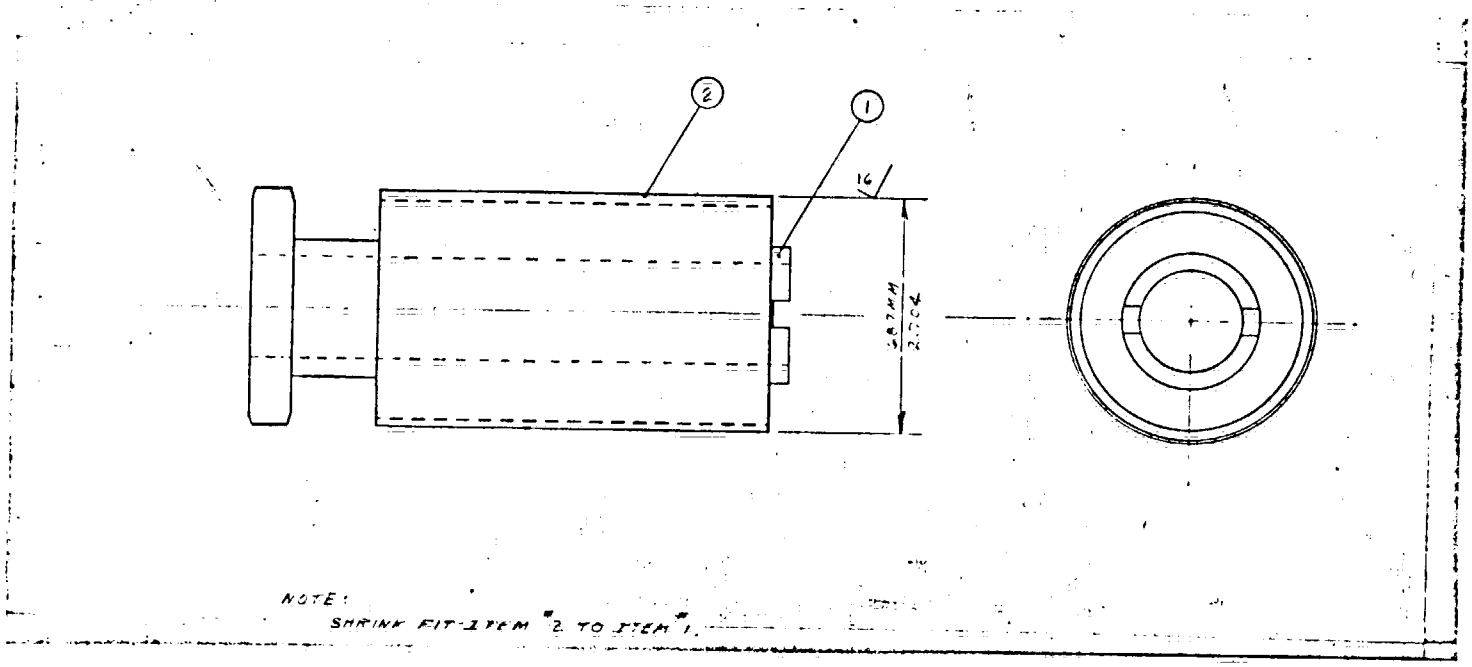
Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000

FIGURE X



10003574 48

Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000

APPENDIX IV

TASTE EVALUATION RESULTS

1000352449

Source: https://www.industrydocuments.ucsf.edu/docs/mmn0000

PHILIP MORRIS U.S.A.
RESEARCH CENTER

Keywords

Project No. 2100 Book 6038

No. 70

Smoke flavor Evaluation of
D2AXL Marl 100 type w/ Ecusta perforated tipping ~26% dilution "R 19"
D2AUP Marl 100 type w/ Ecusta porous tipping ~26% dilution "S 21"

Requester: W. Houck
Dates: Dec 14, 15, 1972
Panel: CK, GG, BM, LS, AF
Procedure: Same as p. 1 this bb

Results:

D2AXL "R 19"			vs	D2AUP "S 21"		
signif on test	panel agreement	mean intensity	character notes	mean intensity	panel agreement	signif on test
*	4/5	3.0	gas phase	2.2		
		0.8	astringent	1.7	3/5	*
*	3/5	3.2	mouth coating	2.7		
		1.4	hay/tobacco	2.6	4/5	**
NS	4/5	3.3	tongue harshness	2.3		

* = p.L.10
** = p.L.05
NS - not significant under statistical analysis but signif. by panel agreement

Read and understood by _____ Name [signature]
Date _____ Date December 20, 1972

1000357450

Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000

PHILIP MORRIS U.S.A.
RESEARCH CENTER

Project No. 2100 Book 6998

Keywords

Nº 5

Smoke flavor evaluations of
X6D3QJ Marlboro Lights w/ porous tipping
X6D3SF Production Marlboro Lights
Requester: W. Houck
Date: May 2, 3, '73
Panel: PM, LS, JW, BT, AF
Procedure: Same as p. 1 this bk.

Results:

X6D3QJ			vs	X6D3SF		
Stat sig	Panel Agreement	Mean intensity	Character notes	Mean intensity	Panel Agreement	Stat sig
		4.9	total response	5.2	3/5	*
		4.4	taste level	4.7	3/5	*
		0.9	sweet basic	1.4	3/5	*
		3.1	green	3.4	3/5	*
**	4/5	3.4	mouth drying	2.7		
		1.4	mouth coating	2.9	4/5	**
		2.6	spicy	3.2	4/5	NS
		0.8	hay / tobacco	1.4	3/5	*
		3.8	overall [illegible]	4.4	5/5	**
		2.5	tongue [illegible]	3.4	5/5	**
		3.1	throat [illegible]	3.5	4/5	**

* = L.10
** = L.05
NS = not statistically significant but significant by panel agreement

Read and understood by _____ Name [illegible]
Date _____ Date May 8, 1973

1000357451

Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000

KEY WORDS

see title

BOOTH TEST DATA

POL & SEF SUMMARY SHEET

PROJECT NO. 2100

TITLE: Marlboro 100mm. type with perforated tipping, coded D2AXL "C" vs. Marlboro 100mm. type with porous tipping coded D2AUP "E"

REQUESTER W. Houck DATE:LAB Dec. 5, 1972 N 30

POL Nov. 29-30, 1972 N 63

TEST METHOD Paired Comparison PREPARATION crackers and water

PURPOSE To determine differences in smoke flavor.

PROCEDURE Using reduced lighting (to the lowest possible level) and the above preparations, judges were given the samples in a balanced presentation. Then they answered the questions on the attached ballot.

RESULTS:

harsher	more total taste	more spicy	smoother	more little	more tobacco like	prefer			
C E NO	C E NO	C E NO	C E NO	C E NO	C E NO	C E NO			
12 11 7 ns	9 13 8 ns	14 8 8 ns	8 8 14 ns	6 12 12 ns	8 13 9 ns	1 17 4 ns	Lab		
29 28 6 ns	33 24 6 ns	29 26 8 ns	23 23 17 ns	27 24 12 ns	25 32 6 ns	26 30 7 ns	Pol		
41 39 13 ns	42 37 14 ns	43 34 16 ns	31 31 31 ns	33 36 27 ns	33 45 15 ns	35 47 11 ns	Comb.		

	comparison with your own brand		
	C E	C E	C E
m	3.43 3.53	3.62 3.65	3.56 3.61
t	0.43	0.17	0.37
p	ns	ns	ns
	LAB	POL	COMB

Conclusions: Judges found no significant differences between the samples.

SIGNED Faye Reynolds DATE COMPLETED Dec. 5, 1972
Ballot #14-A

1000357452

Source: https://www.industrydocuments.ucsf.edu/docs/mmn10000

NAME_____ DATE_____ TIME_____

PLEASE LIGHT THE CIGARETTES IN ALPHABETICAL ORDER. TAKE AS MANY PUFFS AS NECESSARY TO EVALUATE THE CIGARETTES.

	First Cigarette	Second Cigarette	No Difference
CHECK ONE - LEAVE NO BLANKS: CODE:	_____	_____	
1. WHICH IS HARSHER (MORE INHALATION IMPACT)?	_____	_____	_____
2. WHICH HAS MORE TOTAL TASTE?	_____	_____	_____
3. WHICH IS MORE SPICY (MORE PEPPERY OR STINGING TO MOUTH AND NASAL AREAS)?	_____	_____	_____
4. WHICH IS SWEETER?	_____	_____	_____
5. WHICH IS MORE BITTER?	_____	_____	_____
6. WHICH IS MORE TOBACCO-LIKE IN FLAVOR?	_____	_____	_____
7. WHICH CIGARETTE DO YOU PREFER?	_____	_____	_____

8. RATE HOW YOU FEEL ABOUT THE CIGARETTE CODED _____ AS COMPARED WITH YOUR OWN BRAND:

very much worse	much worse	moderately worse	slightly worse	same	slightly better	moderately better	much better	very much better

9. RATE HOW YOU FEEL ABOUT THE CIGARETTE CODED _____ AS COMPARED WITH YOUR OWN BRAND:

very much worse	much worse	moderately worse	slightly worse	same	slightly better	moderately better	much better	very much better

SEF-14A

1000352453

Source: https://www.industrydocuments.ucsf.edu/docs/pnnm0000

KEY WORDS

see title

BOOTH TEST DATA

POL & SEF SUMMARY SHEET

PROJECT NO. 2100

TITLE: Production Marlboro Light: Coded X6D3SF "C" vs. Marlboro Light Igneous Tipping Coded X6D3QT "E"

REQUESTER: [illegible] DATE: LAB May 25, 1973 N 30

POL May 16-17, 1973 N 47

TEST METHOD: Paired Comparison PREPARATION: Cracker and water

PURPOSE: To determine differences in smoke flavor.

PROCEDURE: Using reduced lighting and above preparation, judges were given the samples in a balanced presentation. Then they answered the questions on the attached ballot.

RESULTS: C = X6D3SF E = X6D3QT ND = No differences

harsher	total taste	more spicy	sweeter	more bitter	lab like	[illegible]			
C E ND	C E ND	C E ND	C E ND	C E ND	C E ND	C E ND			
11 13 5 ns (INC)	11 11 8 ns	12 11 7 ns	9 7 14 ns	9 9 12 ns	9 13 7 ns (INC)	11 11 8 ns	Lab		
18 21 8 ns	20 23 4 ns	18 20 9 ns	23 15 9 ns	17 24 6 ns	19 25 5 ns	23 14 5 ns	POL		
29 34 15 ns	31 34 12 ns	30 30 16 ns	32 32 25 ns	26 35 18 ns	28 36 12 ns	34 30 13 ns	Comb		

Compared with your own brand								
	C	E		C	E		C	E
m	3.50	3.30	m	3.36	3.38	m	3.42	3.35
t	0.70		t	0.13		t	0.43	
p	ns		p	ns		p	ns	
	LAB			POL			COMB	

Conclusions: The panel judges found no significant differences between the samples.

SIGNED [illegible] DATE COMPLETED May 29, 1973

1000357454

Source: https://www.industrydocuments.ucsf.edu/docs/mmh0000

NAME_____ DATE_____ TIME_____

PLEASE LIGHT THE CIGARETTES IN ALPHABETICAL ORDER. TAKE AS MANY PUFFS AS NECESSARY TO EVALUATE THE CIGARETTES.

	First Cigarette	Second Cigarette	No Difference
CHECK ONE - LEAVE NO BLANKS: CODE:	_____	_____	
1. WHICH IS HARSHER (MORE INHALATION IMPACT)?	_____	_____	_____
2. WHICH HAS MORE TOTAL TASTE?	_____	_____	_____
3. WHICH IS MORE SPICY (MORE PEPPERY OR STINGING TO MOUTH AND NASAL AREAS)?	_____	_____	_____
4. WHICH IS SWEETER?	_____	_____	_____
5. WHICH IS MORE BITTER?	_____	_____	_____
6. WHICH IS MORE TOBACCO-LIKE IN FLAVOR?	_____	_____	_____
7. WHICH CIGARETTE DO YOU PREFER?	_____	_____	_____

8. RATE HOW YOU FEEL ABOUT THE CIGARETTE CODED _____ AS COMPARED WITH YOUR OWN BRAND:

very much worse	much worse	moderately worse	slightly worse	same	slightly better	moderately better	much better	very much better

9. RATE HOW YOU FEEL ABOUT THE CIGARETTE CODED _____ AS COMPARED WITH YOUR OWN BRAND:

very much worse	much worse	moderately worse	slightly worse	same	slightly better	moderately better	much better	very much better

SEF-14A

1000357455

Source: http://www.industrydocuments.ucsf.edu/tobacco/...

Accession No. 74-003

Copy No. 9

Issued To JK Hauck

PHILIP MORRIS U.S.A.

RESEARCH CENTER

CHARGE NO. & TITLE: 2100 - Filter Development

TYPE REPORT: ○ANNUAL ○SEMIANNUAL ○COMPLETION ⊗SPECIAL

DATE: January, 1974 PERIOD COVERED:

REPORT TITLE:

CONFIDENTIAL

A FIELD TEST OF A 100 mm MARLBORO CIGARETTE D3AMU-1 (CONTROL) VS. A 100 mm MARLBORO TYPE CIGARETTE WITH ECUSTA POROUS TIPPING D3AMV-1 (EXPERIMENTAL) MPT-1

WRITTEN BY R. A. Howes

R. A. Howes

APPROVED BY M. E. Johnston

M. E. Johnston

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Day File (2)
Central File (2)

KEYWORDS:

Ecusta Tipping, Marlboro 100's

1000357456

Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000

CONCLUSIONS...

There were no significant differences noted by the total panel between the two cigarettes; however, there is some evidence that the experimental Marlboro 100 may be preferred by younger smokers.

1000357457

Source: https://www.industrydocuments.ucsf.edu/docs/mpnl0000

PURPOSE...

The purpose of this study was to determine, with subjective evaluation, consumer response to non-obvious dilution via porous tipping in a 100 mm Marlboro type cigarette. Mr. W. G. Houck, Jr., was the test requester.

CIGARETTES...

The control cigarette was a production Marlboro 100 with standard Hauni dilution and plain cork tipping instead of the two gold line production type. The experimental was a Marlboro 100 type cigarette with Ecusta porous tipping.

Analytical descriptions of the two cigarettes may be found in Appendix A. They were not different in any of the parameters tested.

PROCEDURE...

The test was mailed September 5, 1973, to a panel of 600 100 mm regular filter smokers selected from the POL National Roster. Each panelist received a split carton (5 packs vs. 5 packs) of the two cigarettes, a ballot, and a return envelope.

1000357458

Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000

The ballot contained nine-point scales comparing each cigarette to the panelists' usual brand, five qualitative attributes to be ascribed to one, both, or neither of the cigarettes, and an overall preference question. Panelists were also asked what brand they smoked and consumption per day (see Appendix B).

The cigarettes were packaged in plain white packs with red and black alpha-numeric codes as follows:

	Marlboro 100's Control	Marlboro 100's w/Porous Tipping
Red	E4	G8
Black	G8	E4

RESULTS . . .

The data were analyzed when 375 (63%) usable ballots had been received. Ratings and answers by the total panel and various demographic sub-groups may be found in Tables 1 through 10.

There were no statistically significant total panel differences on any of the questions asked.

There was a tendency on the rating scale for the higher mean rating to be accorded to the experimental cigarette by females aged 18-34 ($p<.07$) and 100 mm smokers aged 18-34 ($p<.07$). There was also a tendency for smokers aged 18-29 to prefer the experimental ($p<.08$).

1000357459

https://www.industrydocuments.ucsf.edu/docs/mmnl0000

Significant differences on the attribute questions were few in number - only 4 at the .05 level out of a possible 115 - and we believe these were primarily due to preference justification. Males and males aged 18-34 ascribed a "bitter taste" to the control cigarette, while females aged 18-34 and 100 mm smokers aged 18-34 ascribed an "off-taste" to the control. Also, the total panel tended to ascribe a "bitter taste" to the control ($p<.08$).

The above "differences" from the attribute questions were tested with the preference justification effect analysis* and only one - males aged 18-34, "bitter taste" - was found to be due to differences in the cigarettes. The rest resulted from preference justification. We tend to go along with this conclusion as there are no clues in the analytical data or in past tests of Marlboro 100's that would lead us to believe that panelists would be detecting an "off" or bitter note in the control cigarette.

The results as a whole show very few differences for so many breakouts. If they indicate any difference in acceptability, it is that younger smokers tend to favor the experimental cigarette. There is certainly no indication that Ecusta porous tipping impairs the acceptability of a Marlboro 100 type cigarette..

---

*This analysis was developed by John Tindall and is discussed in his memo to Al Udow and Ed Gray, May 12, 1972, "Overcoming Preference Justification in Standard Field Test Format."

1000352460

Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000

APPENDIX A

Analytical Summary

	Marlboro 100 Control D3AMU-1	Marlboro 100 Porous Tipping Paper D3AMV-1
Smoke		
Butt Length, mm	34	34
FTC Tar, mg/cigt.	16.4	16.1
Nicotine, mg/cigt.	1.13	1.12
Puffs/cigt.	10.4	10.2
Filtration Eff., %	48	46
Cigarette		
Total RTD, in. of H_2O	4.27	4.02
Static Burn. Time, min.	7.5	7.5
Length, mm	99.5	99.5
Circumference, mm	24.9	24.9
Paper		
Additive, type	Cit.	Cit.
Porosity, sec.	15	15
Filter		
RTD, in. of H_2O	2.74	2.53
Length, mm	27.0	26.9
Weight, gms	0.171	0.171
Tipping paper length, mm	31	31
Dilution, %	21	20
Filler		
Total alkaloids, %	1.54	1.60
Total reducing sugars, %	6.0	6.1
Wt. of Tob., gms	0.951	0.923
Rod Density, gms/cc	0.266	0.258

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Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000

APPENDIX B

Ballot

100035462

Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000

If this label needs to be changed, please fill in the corrections below:

Name _____

Street _____

City _____

State _____ Zip Code _____

Telephone Number( ) _____

Is this change only for you? ____ or all members of the family? ____ (✓ one)

Dear Panelist: MPT-1 R

This package contains ten packs of cigarettes. Smoke the five packs of G8 first and complete the scale rating for G8 (Question 1). Next, smoke the five packs of E4 and complete the scale rating for E4 (Question 2). Then answer the remaining questions.

1. Place an X in the box that best completes the following sentence: Compared to my regular cigarette, I think that G8 is:

very much worse	much worse	moderately worse	slightly worse	same	slightly better	moderately better	much better	very much better

2. Place an X in the box that best completes the following sentence: Compared to my regular cigarette, I think that E4 is:

very much worse	much worse	moderately worse	slightly worse	same	slightly better	moderately better	much better	very much better

Please read the statements below and decide to which cigarette each statement applies. If a statement does not describe either cigarette, check "neither." If a statement describes both cigarettes, check "both."

	G8	E4	Both	Neither
3. Had a rich tobacco taste.	___	___	___	___
4. A bitter-tasting cigarette.	___	___	___	___
5. Too harsh a cigarette.	___	___	___	___
6. Had an off-taste.	___	___	___	___
7. Too weak a cigarette.	___	___	___	___

8. All things considered, which cigarette do you prefer?

___G8 ___E4

What brand do you usually smoke? _____

Is it filtered? ☐ Yes ☐ No (check one)

Is it menthol? ☐ Yes ☐ No (check one)

If it is filtered, is it ☐ King Size or ☐ Extra Long (100mm) (check one)

How many cigarettes do you smoke per day? _____

Please do not write in the spaces below.	
20	25
21	26
22	27
23	60-3
24	63-2

Thank you,

PRODUCT OPINION LABORATORY

100052463

Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000

Accession No. 74-006

Copy No. 1

Issued To W. Houck

PHILIP MORRIS U.S.A.

RESEARCH CENTER

CHARGE NO. & TITLE: 2100 - Filter Development

TYPE REPORT: ○ANNUAL ○SEMIANNUAL ○COMPLETION ⓧSPECIAL

DATE: January, 1974 PERIOD COVERED:

REPORT TITLE: CONFIDENTIAL

A FIELD TEST OF AN 85 mm MARLBORO LIGHTS CIGARETTE D3AIS-1 (CONTROL) VS. AN 85 mm MARLBORO LIGHTS TYPE CIGARETTE WITH ECUSTA POROUS TIPPING D3AIT-1 (EXPERIMENTAL)

LPT-1

WRITTEN BY J.C. Williams Jean C. Williams

SUPERVISED BY E.A Howes R. A. Howes

APPROVED BY M E Johnston M. E. Johnston

DISTRIBUTION:

R. Seligman
H. Wakeham
F. Resnik
R. Thomson
T. Osdene
J. Osmalov
W. Claflin
P. Gauvin
W. Houck
Indexer
Day File (2)
Central File (2)

KEYWORDS:

Ecusta Tipping, Marlboro Lights

Source: https://www.industrydocumentslibrary.ucsf.edu/docs/mmnl0000

1000357464

CONCLUSIONS...

There were no total panel differences between the two cigarettes and the sub-panel differences were minimal - males aged 18-34 accorded a higher mean acceptability rating to the control Marlboro Lights, while Parliament smokers preferred the ~~experimental.~~ CONTROL

1000352465

Source: https://www.industrydocumentslibrary.ucsf.edu/docs/mnnl0000

PURPOSE . . .

The purpose of this study was to evaluate consumer response to non-obvious dilution via Ecusta porous tipping on a Marlboro Lights type cigarette. Mr. W. G. Houck, Jr. was the test requester.

CIGARETTES . . .

The control cigarette was a production Marlboro Lights with perforated tipping and the experimental a Marlboro Lights type cigarette with Ecusta white porous tipping. Both tippings had a special gold dot print design, necessary to conceal the rod-filter juncture on the porous tipping model.

Analytical data on the two cigarettes are contained in Appendix A. They were not different in any of the parameters.

PROCEDURE . . .

The test, consisting of a split-carton (5 packs vs. 5 packs) of the two cigarettes, was mailed August 30, 1973, to a panel of 600 health-filter smokers from the POL National Roster. The cigarettes were packaged in plain white packs with red and black alpha-numeric codes, as follows:

	Control	Experimental
Red	C9	E7
Black	E7	C9

1000352466

Source: https://www.industrydocumentslibrary.ucsf.edu/docs/mmnl0000

The ballot contained nine-point acceptability rating scales comparing the two cigarettes to the panelists' usual brand; five qualitative attributes to be ascribed to one, both, or neither of the two cigarettes; and a preference question. Panelists were also asked the brand they usually smoked and consumption per day.

RESULTS . . .

The data were tabulated and analyzed when 345 (57.5%) usable ballots had been received. Tables 1 through 10 contain ratings and answers for the total panel and by various demographic breakouts.

There were no significant total panel differences on any of the questions.

The control Marlboro Lights cigarette was accorded the higher mean acceptability rating by the 52 males aged 18-34 ($p<.02$) and marginally by the 81 smokers aged 30-39 ($p<.07$). On the preference question Parliament smokers (N=33) preferred the control ($p<.05$).

There were very few significant differences on the attribute questions (three), and we believe these resulted from preference justification.

1000357467

Source: https://www.industrydocumentslibrary.ucsf.edu/docs/mmnl0000

APPENDIX A

Analytical Summary

	Marlboro Lights Control	Marlboro Lights Porous Tipping Paper
	D3AIS-1	D3AIT-1
Smoke		
Butt Length, mm	33	33
FTC Tar, mg/cigt.	13.4	13.9
Nicotine, mg/cigt.	0.99	1.02
Puffs/cigt.	8.6	8.6
Filtration Eff., %	49	48
Cigarette		
Total RTD, in. of H_2O	4.15	3.97
Static Burn. Time, min.	7.4	7.5
Length, mm	84.4	84.6
Circumference, mm	25.0	25.1
Paper		
Additive, type	Cit.	Cit.
Porosity, sec.	11	12
Filter		
RTD, in. of H_2O	3.0	2.9
Inner	1.8	1.7
Outer	1.2	1.2
Length, mm	25.1	25.0
Inner	10.0	10.2
Outer	15.1	14.8
Weight, gms	0.303	0.303
Inner	0.071	0.072
Outer	0.232	0.231
Tipping paper length, mm	30	30
Dilution, %	17	17
Filler		
Total Alkaloids, %	1.62	1.63
Total Reducing Sugars, %	7.0	7.2
Wt. of tob., gms	0.762	0.754
Rod Density, gms/cc	0.258	0.252

1000352468

Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000

APPENDIX B

Ballot

10003572469

Source: https://www.industrydocuments.ucsf.edu/docs/hmnl0000

If this label needs to be changed, please fill in the corrections below:

Name_____

Street_____

City_____

State_____ Zip Code_____

Telephone Number (___) _____

Is this change only for you? ___ or all membens of the family? ___ (✓ one)

LPT-1
R

Dear Panellist:

This package contains ten packs of cigarettes. Smoke the five packs of E7 first and complete the scale rating for E7 (Question 1). Next, smoke the five packs of C9 and complete the scale rating for C9 (Question 2). Then answer the remaining questions.

1. Place an X in the box that best completes the following sentence: Compared to my regular cigarette, I think that E7 is:

very much worse	much worse	moderately worse	slightly worse	same	slightly better	moderately better	much better	very much better

2. Place an X in the box that best completes the following sentence: Compared to my regular cigarette, I think that C9 is:

very much worse	much worse	moderately worse	slightly worse	same	slightly better	moderately better	much better	very much better

Please read the statements below and decide to which cigarette each statement applies. If a statement does not describe either cigarette, check "neither." If a statement describes both cigarettes, check "both."

	E7	C9	Both	Neither
3. Had a rich tobacco taste.	___	___	___	___
4. A bitter-tasting cigarette.	___	___	___	___
5. Too harsh a cigarette.	___	___	___	___
6. Had an off-taste.	___	___	___	___
7. Too weak a cigarette.	___	___	___	___

8. All things considered, which cigarette do you prefer? ___E7 ___C9

What brand do you usually smoke? _____

If it filtered? ☐ Yes ☐ No (check one)

Is it menthol? ☐ Yes ☐ No (check one)

If it is filtered, is it ☐ King Size or ☐ Extra Long (100mm) (check one)

How many cigarettes do you smoke per day? _____

Please do not write in the spaces below	
20	25
21	26
22	27
23	60-3
24	63-2

Thank you,

PRODUCT OPINION LABORATORY

1000357470

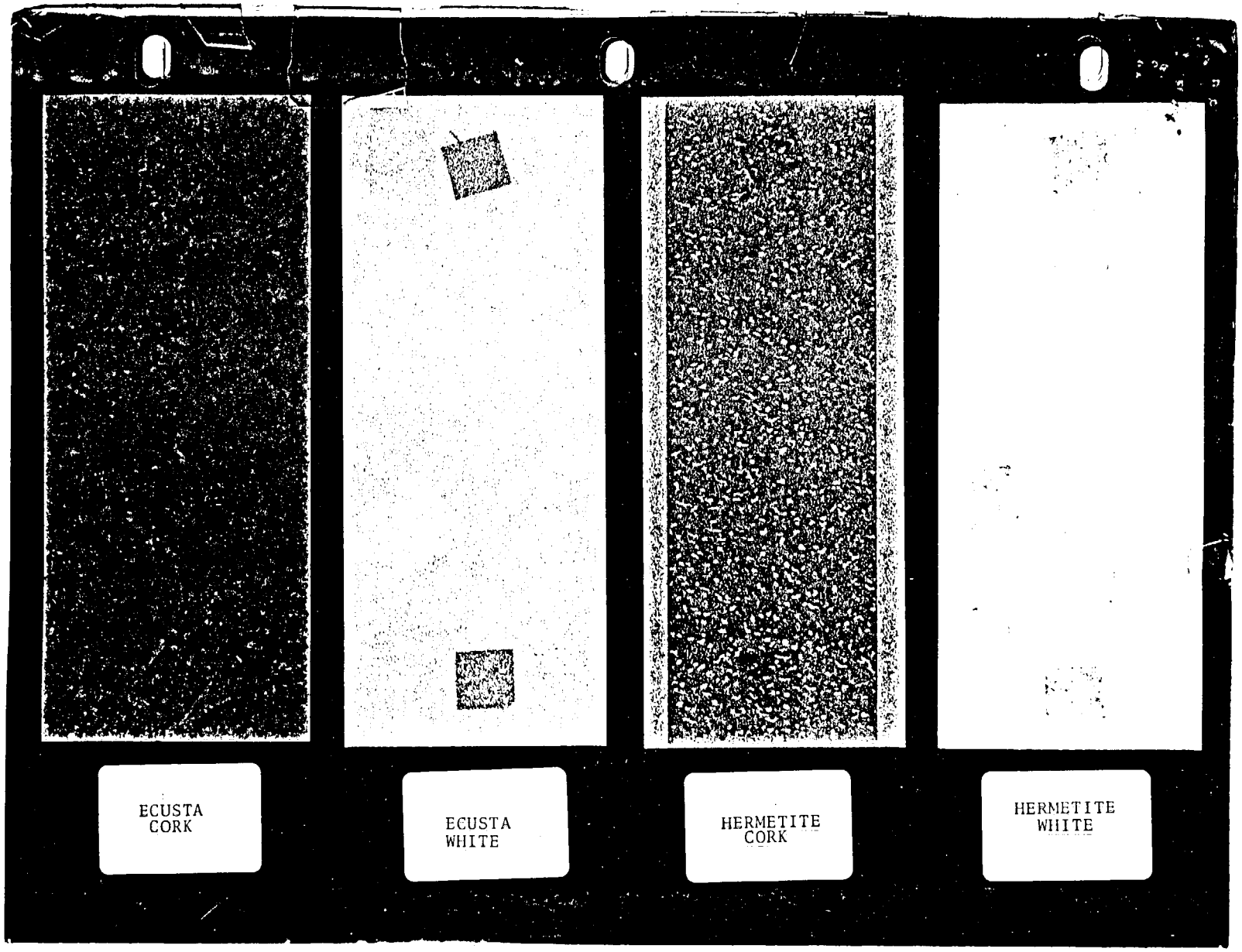
Source: https://www.industrydocuments.ucsf.edu/docs/mnm10000

APPENDIX V

TIPPING SAMPLES

10003524?1

Source: https://www.industrydocuments.ucsf.edu/docs/nrdf0000



10003574772

Source: https://www.industrydocuments.ucsf.edu/docs/mmnl0000